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FINAL REPORT

PROBABILITY OF ARCHAEOLOGICAL SITE OCCURRENCE IN
THE NORTHERN PORTION OF THE BIRDS POINT-NEW MADRID FLOODWAY:
AN ANALYSIS OF THE DISTRIBUTION OF CULTURAL RESOURCES
AND ENVIRONMENTAL FEATURES

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Prepared by
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Principal Investigator
Duncan C. Wilkie

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Mary Ann Palmer Niemczycki

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Purchase Order No. DACW66-87-M-0819

Duncan C. Wilkie

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October 30, 1987

ABSTRACT

This study included the systematic collection and analysis of data on archaeological, historic and architectural resources and their distribution within and immediately adjacent to a portion of Birds Point- New Madrid Floodway, Mississippi County, Missouri. The study area included all of the Floodway, located between the southern boundary (310' contour) of O'Bryan Ridge and Birds Point. The purpose of this study was the development of a predictive model to be used in the selection of areas for a proposed intensive cultural resource survey.

This study was conducted by Duncan C. Wilkie (Principal Investigator) and Mary Ann Niemczycki of Cultural Resource Consultants July-August 1987. It involved an intensive literature and site file search as well as consultation with individuals knowledgeable about local cultural resources and environment. Data on archaeological site distribution; prehistoric and historic settlement patterns; and the environmental setting of the study area were analyzed using an interdisciplinary approach to identify areas which would have the highest probability of archaeological site occurrence. The distribution of archaeological sites was examined in relation to elevation, soils, landforms, biotic communities, water resources and the man-made environment.

Since site discovery and reporting within the study area has been linked to historic land use patterns a great deal of bias is expected in the data on site distribution. However, certain patterns of human occupation were observed. Analysis of the archaeological and environmental data revealed that known prehistoric sites occurred on only 6 soil types, all associated with old levees, ridgetops or terraces. Elevation and water resources were found to have little value in prediction of prehistoric site occurrence. Historic sites were largely associated with recent alluvial deposits and were located along the levee system. However, examination of historic sources revealed that settlement until late in the historic period was concentrated on ridgetops and along the riverfront.

A number of areas were eliminated from consideration because they had been surveyed or were already designated for intensive survey. Others, such as artificial levee, ditches, and land graded areas, were excluded as having close to 0% probability of producing intact sites. A sampling universe of approximately 6,500 acres within the study area were identified as having the highest probability of archaeological site occurrence. Simple random sampling to select approximately 3,000 acres from this sampling universe for intensive survey was recommended.

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INTRODUCTION

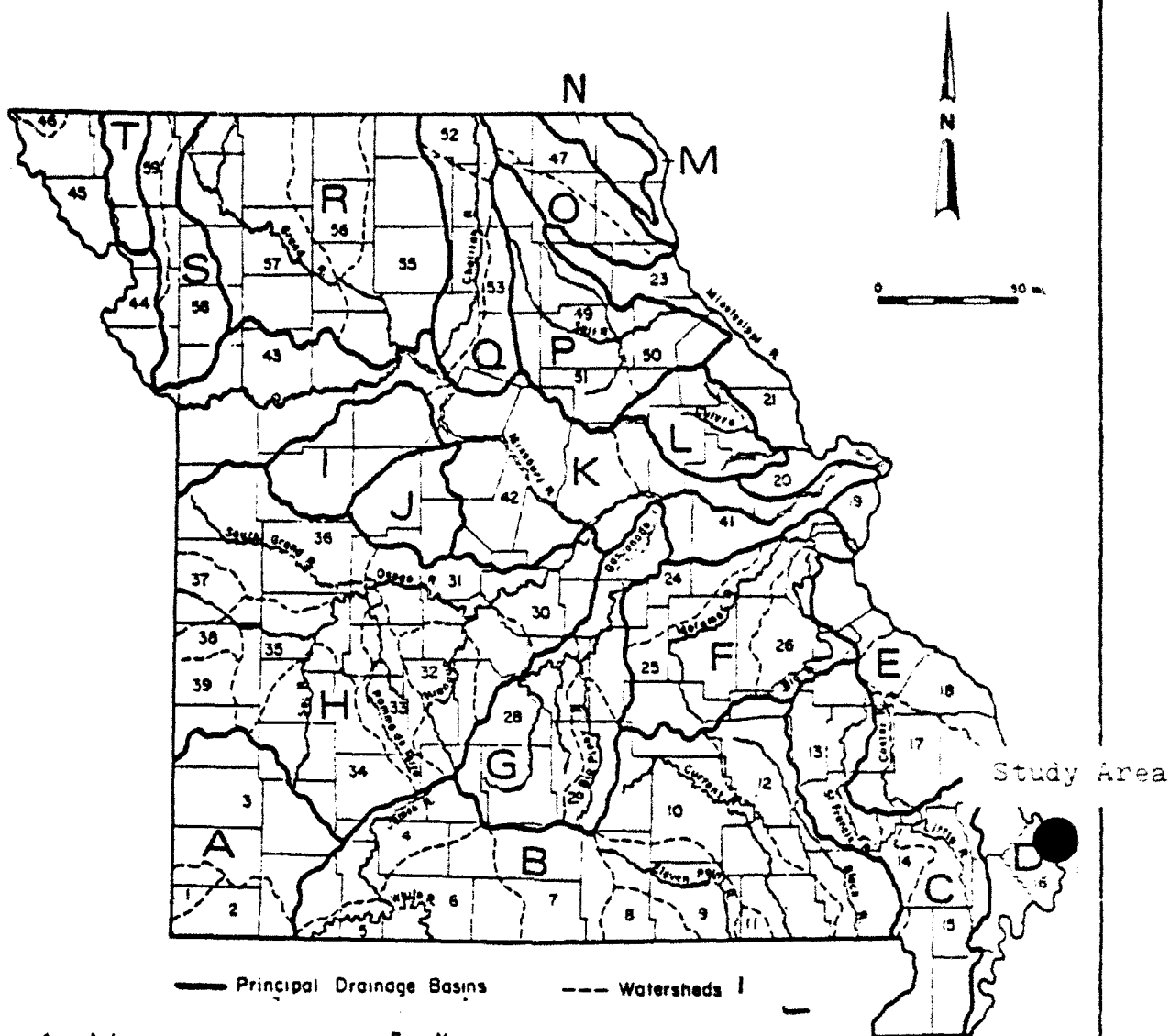
DESCRIPTION OF STUDY

This study was conducted for the Memphis District, U. S. Army Corps of Engineers under purchase order DACW66-87-Q-0061. It included the systematic collection and analysis of data on cultural resources and environment; and development of a predictive model for the intensive survey of portions of the Birds Point-New Madrid Floodway, Mississippi County as described in the Scope of Work (Appendix A). The study area is located in the Lower Mississippi drainage basin of the Lower Mississippi watershed in the Lower St. Francis-Lower Mississippi management unit (Weichman n.d., see Figure 1). It encompasses portions of T26N R16E (sec. 25), T26N R17E (sec. 1-3, 9 -17, 19-32, 34-36), T26N R18E (sec. 4-9, 17-19, 30), T27N R17E (sec. 25, 35, 36), T27N R18E (sec. 19, 20, 28-33) in Mississippi County, Missouri.

The study area covers approximately 17,500 acres and is bounded on the west by the setback levee, on the east and north by the main line levee, and on the south by the first 310 foot contour line extending from the setback levee east to the setback levee (along the south slope of O'Bryan Ridge). Included in the study area are 900 acres, located in the northern portion of the Floodway between the beginning of levee mile 34 and the beginning of levee mile 37 and extending approximately 1/2 mile landward from the levee, which have already been designated for survey and therefore will not be considered in selecting a survey sample (Figure 2).

The purpose of this study was to develop a predictive model to be used in identifying 17% of the study area for intensive/on-site survey. In order to accomplish this the following objectives were set:

1. Description of the quantity, character, and distribution of known archaeological, historic, and architectural resources within the study area
2. Examination of the settlement patterns (occupation and land use) exhibited by prehistoric and historic populations within the study area
3. Description of the natural environment including topography, soils, geological history, floral and faunal resources as they relate to human occupation of the study area
4. Generation of predictive statements concerning the probable quantity, character and distribution of yet undiscovered/unidentified cultural resources within the study area
5. Definition of the area of highest potential for archaeological site occurrence from which a 17% sample (approximately 3000 acres) of the study area will be selected for intensive survey



- | | | |
|-----------------------------|------------------------|------------------------|
| A. Arkansas | F. Meramec | |
| 1. Lost Creek | 24. Bourbeuse | |
| 2. Elk | 25. Meramec | |
| 3. Spring | 26. Big | L. Cuivre |
| B. White | G. Gasconade | M. Des Moines |
| 4. James | 27. Lower Gasconade | N. Wyaconda/Fox |
| 5. Table Rock | 28. Upper Gasconade | O. Fabius |
| 6. White | 29. Big Piney | 47. North Fabius |
| 7. North Fork | H. Osage | 48. South Fabius |
| 8. Spring | 30. Lower Osage | P. Salt |
| 9. Eleven Point | 31. Lake of the Ozarks | 49. North Fork |
| 10. Current | 32. Nangua | 50. Salt 1 |
| 11. Fourche Creek | 33. Pomme de Terre | 51. Salt 2 |
| 12. Black | 34. Sac | Q. Chariton |
| C. St. Francis | 35. Upper Osage | 52. Upper Chariton |
| 13. Upper St. Francis | 36. South Grand | 53. Lower Chariton |
| 14. Lower St. Francis | 37. Marais des Cygnes | 54. Middle/East Fork |
| 15. Little River | 38. Little Osage | R. Grand |
| D. Lower Mississippi | 39. Marmaton | 55. Grand 1 |
| 16. Lower Mississippi | I. Blackwater | 56. Thompson |
| E. Upper Mississippi | J. Lamine | 57. Grand 2 |
| 17. Whitewater/Castor | K. Missouri | S. Platte |
| 18. Mississippi 1 | 41. Missouri 1 | 58. Platte |
| 19. Mississippi 2 | 42. Missouri 2 | 59. One Hundred & Two |
| 20. Mississippi 3 | 43. Missouri 3 | T. Nodaway |
| 21. Mississippi 4 | 44. Missouri 4 | |
| 22. Mississippi 5 | 45. Missouri 5 | |
| 23. North River | 46. Nishnabotna | |

Figure 1. Missouri Watershed Map showing location of Study Area.

This study was conducted from June through August 1987 by Cultural Resource Consultants. The Principal Investigator was Duncan C. Wilkie assisted by Mary Ann Niemczycki.

BACKGROUND OF THE FLOODWAY PROJECT

The United States acquired possession of the Lower Mississippi Valley through the Louisiana Purchase of 1803. Southeast Missouri was part of this territory offering new lands and resources. However this region was subject to periodic inundation destroying crops, homes, villages and towns. By 1859 organized efforts were being made to control flooding and the resulting damage. The first levee was constructed by a local drainage district in 1859 (Tandarich & Reagan 1978:33, Nixon 1982:1). Periodic flooding and the absence of state assistance led local groups to form drainage districts to control flooding by developing a system of ditches to help in flood control and land reclamation. By 1901 six such systems were in operation (Tandarich and Reagan 1978:35, Nixon 1982:1).

Flooding continued to be a problem but it was the disastrous flood of 1927 that captured public and federal attention. The U.S. Congress formulated the Mississippi River and Tributaries Project to use a combination of levees, floodways, and tributary basin improvements to control the Mississippi floodwaters. The U.S. Army Corps of Engineers was charged with responsibility to execute this project (Nixon 1978:1).

The Bird's Point-New Madrid Floodway was first conceived in 1928 (Clay 1976:99-121). The plan was to construct a setback levee on a general northeast-southwest diagonal between Bird's Point and New Madrid along with a riverfront levee between these towns to create a 5 mile wide floodway. If excessive water built up at Cairo at the southernmost tip of Illinois at the confluence of the Ohio and Mississippi, "fuse plugs" at Bird's Point were to be exploded allowing the water to escape through the floodway to reenter the Mississippi just north of New Madrid. This safety valve would supposedly protect adjacent land and property and mainline levee segments downstream. The entire project was completed by 1933 (Bragg 1977:3-5, Nixon 1982:2).

The only time the fuse plugs were blown was during the flood of 1937 when fourteen crevasses covering a length of 2,140 feet. were created to divert floodwaters into the floodway (Nixon 1982:2). The current study was conducted in partial fulfillment of the Memphis District's obligation under federal legislation providing for the identification and preservation of significant cultural resources in areas likely to be impacted by federally funded projects (see Appendix A: Scope of Work).

ENVIRONMENTAL SETTING

Geography

The Mississippi River stretches from Lake Itasca, Minnesota to the Gulf of Mexico. The southern half of this river system is known as the Lower Mississippi River Valley. This geographic region covers approximately 35,000 square miles of flat, nearly featureless floodplain topography. Floodplain sediments have been deposited here over thousands of years by the meanderings of the Ohio and Mississippi Rivers and their tributaries. The monotonous topography is however broken by several low finger-like ridges of remnant uplands. One of these, Crowley's Ridge, stretches from Advance, Missouri to Helena, Arkansas, divides the upper half of the Lower Mississippi Valley into the Eastern and Western Lowlands. In the Eastern Lowlands the Sikeston Ridge stretching southwest from the Commerce Hills to New Madrid, Missouri subdivides the floodplain of southeast Missouri into the Morehouse Lowlands to the west and the Cairo Lowlands to the east (Nixon 1982:11-12). The Bird's Point-New Madrid Floodway is situated in the Cairo Lowlands (Figure 3).

The Bird's Point-New Madrid Floodway is located in southeast Missouri within the Eastern of Cairo Lowlands portion of the Lower Mississippi Alluvial Valley. The Cairo Lowlands are bounded to the north, east and south by the active Mississippi River channel and on the west by the Sikeston Ridge.

The Cairo Lowlands are bordered on the east by the escarpments of the Mississippi valley wall, to the south by the Mississippi River itself and to the north by the Commerce Hills, a remnant Ozark escarpment (Bretz 1965:72-74). The northern sections of the Cairo Lowlands are characterized by areas of irregular erosion and deposition where the Mississippi has cut through earlier Ohio River deposits. The Matthews Prairie in the central portion of the Cairo Lowlands (located just to the southwest of the project area) consists of older Ohio River deposits which have not been cut by more recent actions of the Mississippi (Nixon 1982:12).

Topographically the area is a complex array of extinct natural levees, backslopes and back swamps. The land surface presents a mixture of sandy loam ridges, and gentle sandy clay slopes with abundant backwater swamps (McNerney 1979:1). Williams (1954:7) suggests that nearly 80% of the alluvial valley was made up of swamps and glades before the historic drainage system was constructed.

The topography of this region is the result of the complex inter-relationship between former Mississippi River channels and their accompanying surface deposits. These have been mapped by Fisk (1944) and Saucier (1964, 1971, 1974). Fisk's work is considered to be the authoritative document on the geological history of the alluvial valley. Saucier has presented a different chronology and interpretation of the Quaternary geology of the valley based on more recent data.

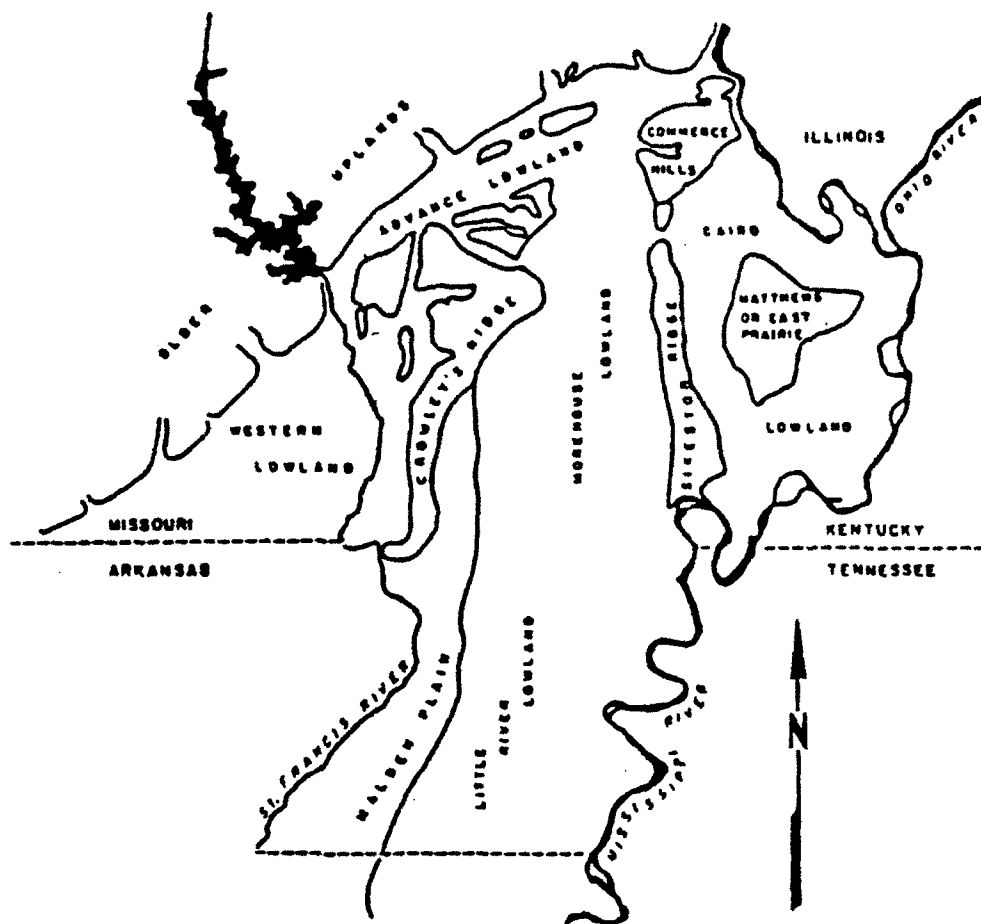


Figure 3. Physiographic Regions in Southeast Missouri.
(after Williams 1974:9)

Saucier (1971:13-40) describes Quaternary deposits in the Lower Mississippi Valley in terms of their origin, composition and configuration. Two kinds of Quaternary deposits are found in the study area (figure 4). These are braided stream terraces and Mississippi Valley alluvium.

Braided stream terraces are the result of glacial outwash or valley train deposits laid down by swiftly flowing, sediment choked braided stream. The younger deposits comprise terrace level 2 which extends into the study area forming O'Bryan Ridge.

Mississippi Valley alluvium consists of a variety of landforms and sediment types. In the study area, these landforms and sediments are the various features of the meander belt (Meander Belt No. 5). The meander belt forms as a result of the lateral migration or meandering of a stream while occupying a single course. This creates an accretion topography consisting of parallel arcuate ridges and swales. Abandoned channels in various stages of filling are conspicuous features of the meander belt. These channels fill with thick deposits of clays and silts which typically support dense swamp or forest vegetation. Well-developed natural levees composed of well-drained silty/sandy clays occur as low ridges along all abandoned channels and as a thin veneer over most accretion topography. The relatively coarse-grained deposits (silty sands, sands and gravels) which form the accretion topography are referred to as point bar deposits.

Meander Belt No. 5 north of Memphis lies in essentially the same location as Nos. 3 and 4 but it is not possible to determine if any of the abandoned channels or other features are associated with these earlier meander belts. Thus Meander Belt No. 5 in the study area "... may contain landforms that are anywhere in age from 0-6,000 years" (Saucier 1971:62).

Tandarich and Reagan (1978:12-13) describe the following "Landscape Positions" in their analysis of the archaeological potential of soil types:

Floodplain: This is the nearly level land consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Natural levee: "A low ridge that parallels a river. It is formed by the alluvium that is deposited when a river spreads over its banks and the water suddenly loses its power to transport sediment" (Brown 1977:69). This concept is subdivided into 'new' and 'old'. The 'new' refers to the natural levee of the active river channel, and 'old' refers to the natural levee of former river channels.

Terrace: "An old alluvial plain, ordinarily flat or undulating, bordering a river,...seldom subject to overflow" (Brown 1977:69).

LEGEND

HOLOCENE



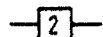
ALLUVIUM Undifferentiated on smaller streams, subdivided in Mississippi Valley as follows:



MISSISSIPPI RIVER MEANDER BELTS Numbered from 1 (oldest) to 5 (youngest). Only latest occupation shown.



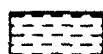
ARKANSAS RIVER MEANDER BELTS Numbered from 1 (oldest) to 4 (youngest).



RED RIVER MEANDER BELTS Numbered from 1 (oldest) to 4 (youngest).



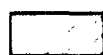
BACKSWAMP AREAS OR FLOODBASINS Areas of overbank deposition not affected by river migration. Extent of areas exaggerated in the Red and Arkansas River valleys where meander belts are shown by dimensionless symbols.



MISSISSIPPI RIVER DELTAIC PLAIN Sub-deltas or delta complexes delineated by dashed lines and numbered from 1 (oldest) to 5 (youngest).



DELTAIC PLAIN DISTRIBUTARIES Not differentiated according to age.



CHENIER PLAIN Cheniers (relict beach ridges) shown as solid lines and not differentiated according to age.

NOTE: No relative ages indicated or implied by the above sequence.

PLEISTOCENE

PRE-SANGAMON STAGES

SANGAMON STAGE

WISCONSINAN STAGE

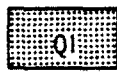
LATE WISCONSIN
EARLY WISCONSIN



BRAIDED-STREAM TERRACE 2 Cones of glacial outwash or valley train deposits of the Mississippi, Ohio, and Arkansas Rivers - sublevels delineated but not identified. Both Holocene and Pleistocene deposition represented.



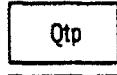
DEWEYVILLE TERRACE Fluvial terrace consisting of relict floodplain deposits of the Arkansas and Ouachita Rivers.



LOESS Principal accumulations of eolian silt - mapped only on uplands in and east of the Mississippi alluvial valley. At least two periods of loess deposition represented. Only loess greater than 10 feet thick mapped in Mississippi.



BRAIDED-STREAM TERRACE 1 Cones of glacial outwash or valley train deposits of the Mississippi, Ohio, and Arkansas Rivers - sublevels delineated but not identified.



PRAIRIE TERRACE FORMATION Includes fluvial terraces of the Mississippi and smaller rivers, relict deltaic plains of the Red and Mississippi Rivers, and a coastal marine depositional terrace.



MONTGOMERY TERRACE FORMATION Maturely dissected terrace of fluvial and/or marine origin.



UNDIFFERENTIATED TERRACES Includes possibly two depositional or erosional terraces of Pleistocene age plus upland fluvial graveliferous deposits of late Tertiary or early Pleistocene age. Also may include Prairie or Montgomery terrace equivalents along small streams in Arkansas and Louisiana where correlations have not been made.

Figure 4. Legend: Quaternary Deposits

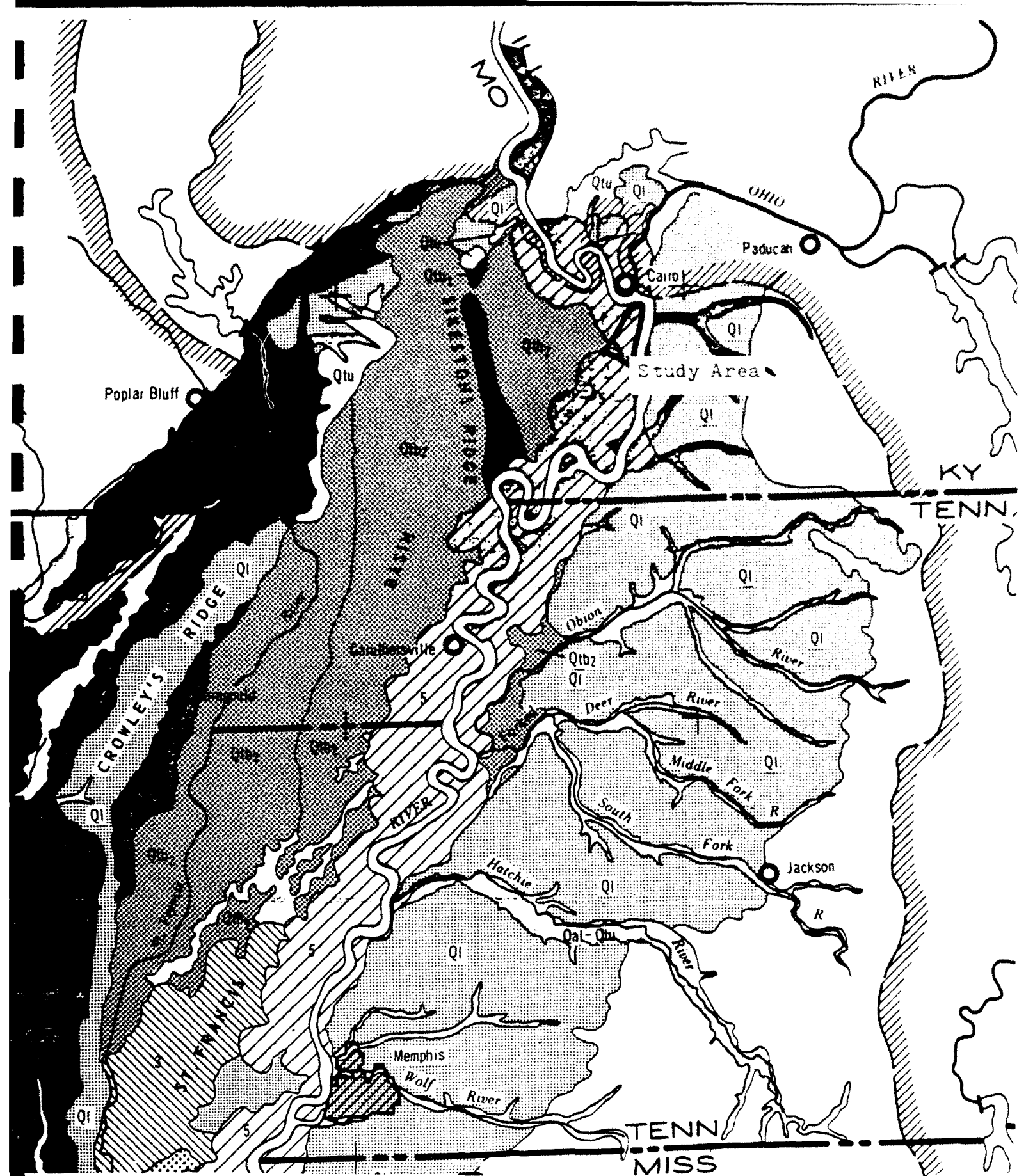


Figure 4. Quaternary Deposits in the Lower Mississippi Valley. (from Saucier 1974)

Geology

The geologic base of the region consists of the entrenched valley system and its covering of recent alluvium. The bedrock deposits forming the entrenched valley vary in age from Paleozoic in the northern end of the valley to Late Pleistocene deposits in southern Louisiana (Nixon 1982:14). Well indurated, sedimentary materials from the Paleozoic form the walls and floor of the valley. These formations contain cherty dolomites, sandstones and shales and are very resistant to erosion (Fisk 1944:11-12).

The most recent deposits, and those most likely to be associated with human occupation, of course, are from the Pleistocene series. Pleistocene deposits (oldest to youngest) are divided into Williana, Bentley, Montgomery, and Prairie formations but except for the youngest they are not found on the valley floor but in the walls (Fisk 1944:13). These deposits consist of compacted, oxidized clays and silty, yellow-brown clays underlain with sands and gravels. Gravels such as Mounds (Lafayette) gravel provided a lithic resource utilized by aboriginal inhabitants of the region (McNerney 1972:4-6, Peters 1980:22-26, Nixon 1982:1982:16)

Massive alluvial deposits lie over the bedrock of the entrenched valley. These deposits consist of stratified sedimentary material with coarse graveliferous sands in the lower portions and deposits of progressively smaller particle size in the upper portions. Lower gravel deposits account for about 45% of the total alluvium and gravels are distributed in thick massive beds in these zones. A complex interfingering of gravels and sands has resulted from the deposition from shallow-channel braided streams (Fisk 1944:17). Upper levels are composed of sands, silts and clays with only occasional gravel concentrations. In some areas of southeast Missouri the lower portions of this upper level are composed of irregular lenses of pervious sands. Most of the current visible surface (excluding sand bars on current streams) is a top stratum of sands, silts and clays overlying these pervious sands (Nixon 1982:17-18).

The shape, distribution, and particle size of top stratum materials vary according to their origin resulting in several different types of formations. Natural levees are comprised of silts, silty clays, and sands laid down along channel banks. They are widest and thickest when they occur on the convex (outside) portion of bends. Sand bars are formed on the concave (inside) portion of bends where the current is slack. channel/slough fills are characterized by fine-grained deposits of interbedded sands, clays or silts which form clay plugs which are more resistant to erosion than surrounding materials. Back swamp deposits occur beyond levees and some distance from channels as lenses of highly organic clays laminate over shallow, broad areas (Nixon 1982:18).

Slough, bayous and rivers on the floodplain periodically overflow their banks and deposit waterborne sediments in layers across the ground surface but the heavier sediments fall out first, nearer to the banks of the waterway. Eventually these heavier sediments

accumulate and "trail" behind the axis of the meander course forming natural levees. Although the relief is slight these natural levees represent some of the highest areas on the floodplain and water quickly drains off of these formations.

Lighter sediments that are not deposited on natural levees are carried away from channels, but medium heavy materials settle onto gentle slopes which fall perpendicularly away from the natural levees. These slopes are slight (0-2%) with moderate drainage.

In areas where water stands, fine grained sediments will be deposited. As a result floodplain lakes, swamps and abandoned channels serve as collectors for clays and silts and eventually accretion will form low dense areas that are practically level. Except for channel troughs these represent the lowest formations on the floodplain (Nixon 1982:18-20).

Although the overall change in total elevation from highest to lowest on the floodplain may be no more than 30 feet. it is great enough that flooding effects can be mitigated by exercise of topographic choice. The locations of known prehistoric sites in the Mississippi valley indicate that aboriginal populations chose areas of higher relief for flood protection (Lewis 1974:29, Williams 1956, Nixon 1982:21).

Geomorphology

At the end of the Wisconsin glaciation, the entrenched valley was partially filled with alluvium and the stage was set for the evolution of the current drainage system. Enormous amounts of glacial meltwater were raising the world sea level. Fisk (1944) used data based on studies of subsurface alluvium and geologic correlations to reconstruct the various stages of the drainage system of the valley. He used changes in sea level to order the early stages and channel changes represented by present day scars on the floodplain surface to order the later stages (Figure 5).

Toward the end of the Wisconsin (ca. 25,000 BP) the downcutting action of streams and tributaries swept large amounts of debris, consisting of both coarse and fine materials in to the valley but these moved freely along waterways into the gulf. Free movement and entrenchment continued throughout a 200 foot rise in sea level. By the -200 foot stage small amounts of materials began to collect at the mouths of streams and tributaries and alluvial fans began to develop, stream velocity gradually slowed and stream channels broadened. The resulting pressure on the Mississippi and Ohio forced them to change channels more frequently and easily. Eventually rising sea level and developing alluvial fans decreased stream gradients and the Mississippi and its tributaries lost their gravel carrying capacity. As a result growth of alluvial fans on tributaries accelerated, channels became shallower, frequency of flooding increased and channel movement and migration became more common (Nixon 1982:22-24).

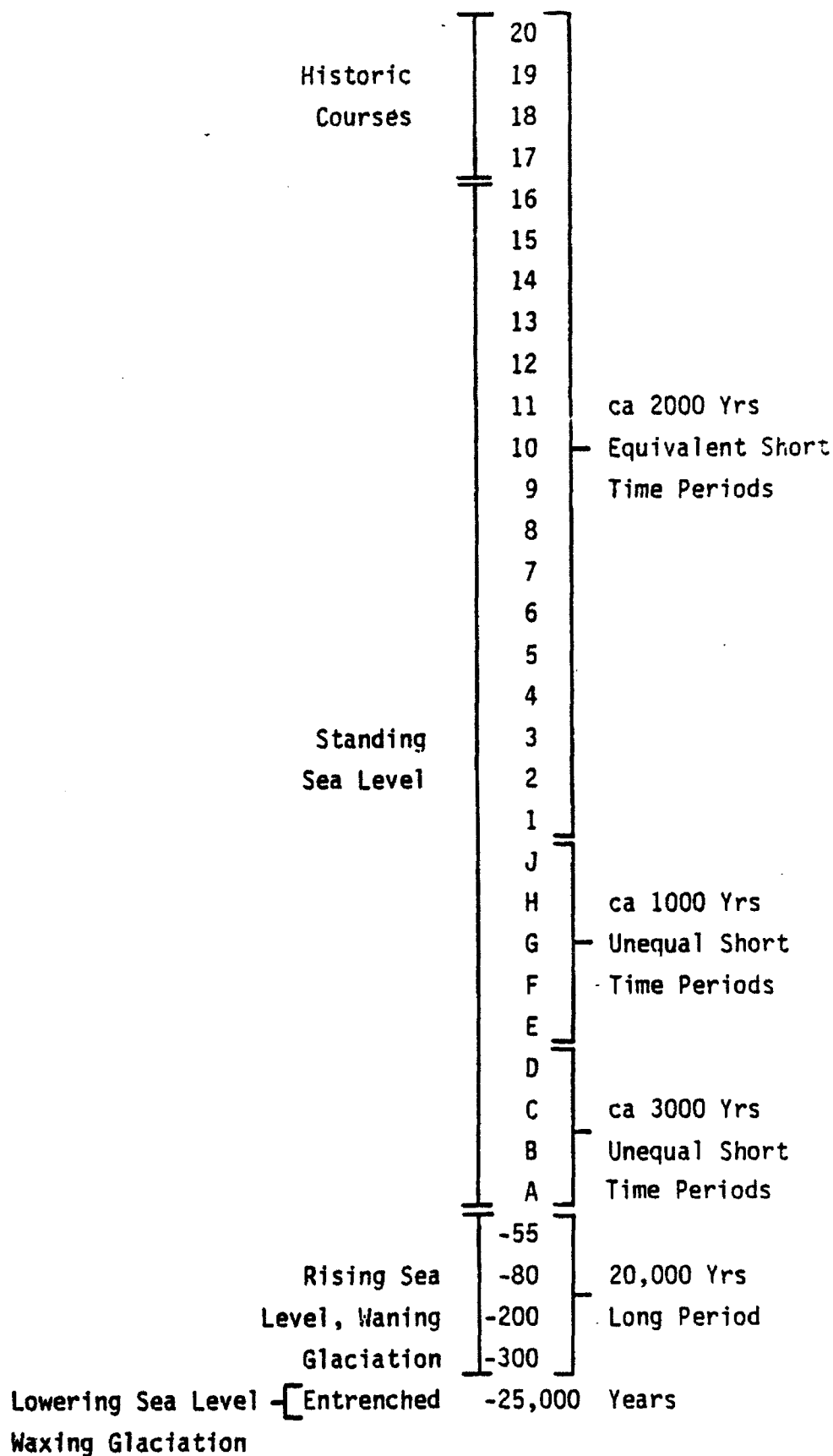


Figure 5. Graphic Representation of Fisk's (1944) Chronology of the Lower Mississippi River Valley. (from Nixon 1982:23)

At this time (Fisk's (1944) A1 stage ca. 20,000 BP) the Ohio followed a braided course through the present Cache River Lowland in southern Illinois entering the Mississippi valley northwest of present-day Cairo, then following a south-southwest course passing near Malden, Missouri, creating an alluvial fan over southeast Missouri and southern Illinois. The Mississippi flowed in a braided channel north of the Commerce Hills to the west of Crowley's Ridge and did not converge with the Ohio until it reached Simmsport, Louisiana. Sea levels continued to rise slowly during the A2 stage and fault activity in the entrenched valley stimulated the diversion of both rivers into new channels with the Ohio entering the Mississippi valley northwest of Cairo and flowing southwest toward New Madrid, roughly parallel to the path of the setback levee of the Bird's Point-New Madrid Floodway. Both rivers apparently began to meander across previously deposited alluvium downstream and their point of confluence moved 100 miles further north.

Sea levels came to a rest at their present level during the A3 stage when the Ohio changed its course upstream from the Cache River Lowland to its present course in the Metropolis Lowland. At this point it flowed into the Mississippi valley just north of Cairo, across the Cairo Lowlands and just east of New Madrid to meet the Mississippi at Tutwiler, Mississippi. The Mississippi moves eastward then westward and finally in the C stages enters the Eastern Lowlands permanently. Its channel changes northwest of the Commerce Hills to flow to the east of Crowley's Ridge through the Morehouse Lowland and through deposits originally laid down by the Ohio. The Ohio continues to flow directly through the project area to meet the Mississippi near Marked Tree, Arkansas.

During the D stages the Western Lowland was completely abandoned by the Mississippi which now experiences active adjustment to its new environment which continues through stages H and J. As the volume of its floodwaters increased spilling through the Thebes gap they were discharged to the south capturing the Ohio northeast of New Madrid. Although during nonflood conditions the gap continued to drain northward, when the Mississippi swelled with floodwater it drained south. Eventually erosion allowed more and more low-water flow passed through the gap and followed the abandoned Ohio River channels meandering through the Cairo lowlands in an eastward trending series to capture the Ohio near Cairo. By Stage 1 (ca. 2,000 BP) the diversion was complete and both rivers meander in and around the Floodway area leaving behind the scars of their activity (Nixon 1982:24-33) (Figure 6).

Saucier believes that Fisk's dates are in error and that the Mississippi meandering pattern began as early as 6000 BP rather than 2000 BP as suggested by Fisk. Saucier (1964, 1971, 1974) limits himself to a discussion of the Quaternary geology of the Lower Mississippi Valley. He feels that Fisk's (1944) division of the Mississippi meander belt into 20 stages representing 100 year phases is not supported by present evidence. According to Saucier (1971:3) the present meander belt in the study area may have been established as early as 6,000 BP and that since the various

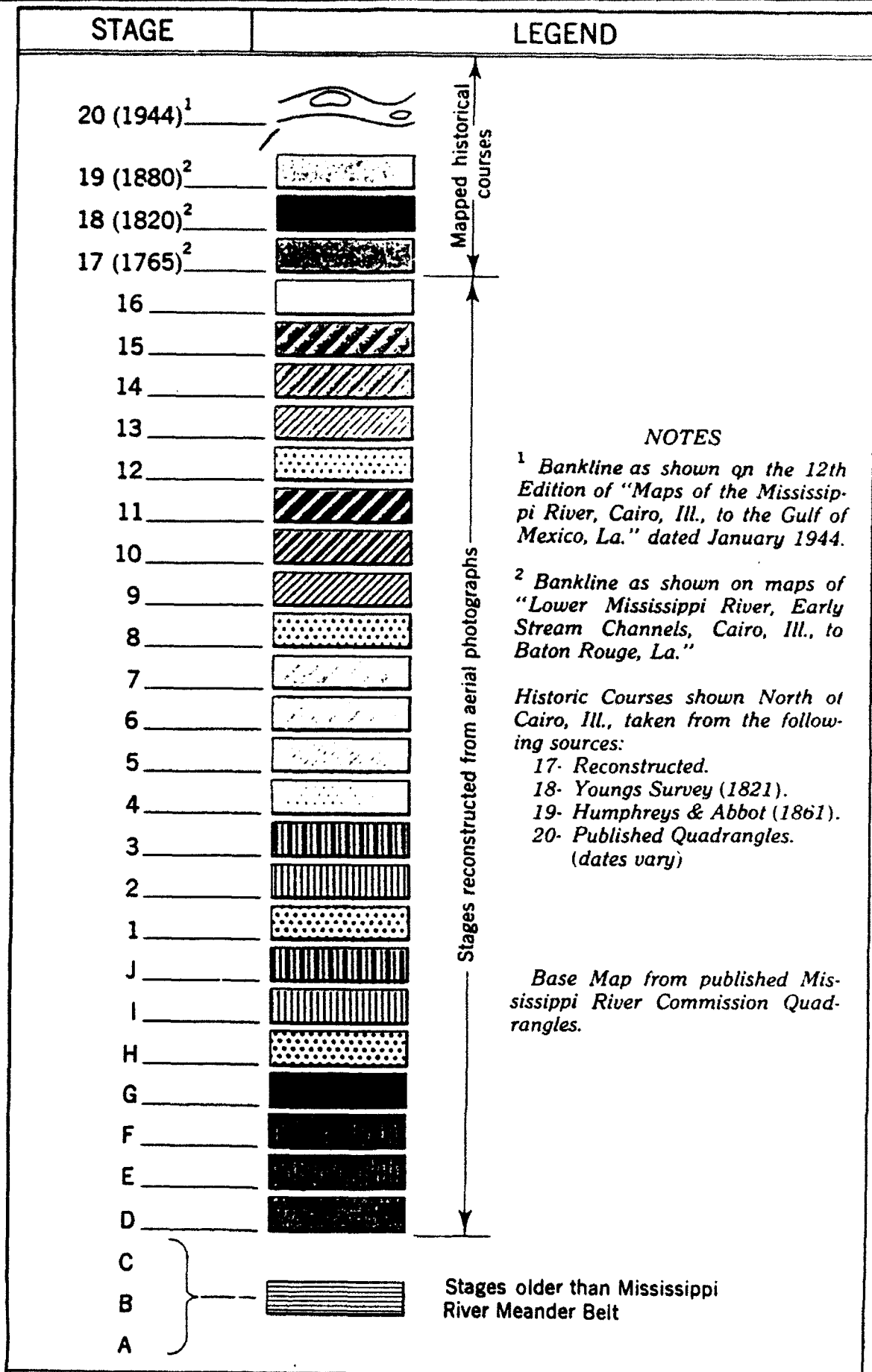


Figure 6. Legend: Abandoned Channels of the Mississippi River Meander Belt.

Figure 6. Abandoned Channels of the Mississippi River Meander Belt. (from Fisk 1944: Plate 22, Sheet 1)



channels of the Mississippi varied a great deal in duration, anything but relative age assignments are premature.

According to Saucier(1971:3-4), cyclic Pleistocene glaciation over the last 1.5 Million years was responsible for the origin, character and distribution of virtually all of the Quaternary deposits in the Lower Mississippi Valley. He believes that the fall in sea level associated with each glaciation did not have a major effect on the Mississippi River in the study area but that valley widening and deepening from other causes were occurring along with alluviation in this region. During each waxing glaciation considerable valley fill was deposited by braided streams carrying coarse-grained glacial debris. This was accompanied by valley widening and deepening (Saucier 1971:4-6).

Sedimentation rates reached their highest levels in the early stages of the last waning glaciation but aggradation in the northern part of the valley probably lasted only a few thousand years. After this the ratio of sediment to meltwater declined and valley degradation began producing braided stream terraces (Saucier 1971:7-8). Finally stream discharge and sediment load was reduced to the point where the Mississippi changed from a braided to a meandering regimen. This probably occurred ca. 6,000 BP in the region north of Memphis, Tennessee. This meandering pattern resulted in slow valley aggradation (Saucier 1971:8, 1974: 17).

The Present day Mississippi-Ohio flows to the east of the project area along the eastern escarpment in a channel that developed through a series of loop cutoffs. This portion of the meander belt is the oldest in the lower valley since it has been occupied by the Ohio since it abandoned the Cache River Lowland (during Fisk's A2 stage). In 1811-1812 the New Madrid earthquake uplifted the Tiptonville Dome and led the deposition of sandy sediments resulting in a slight decrease in the valley slope in this area. As a result the river now flows through these recent deposits as well as mixed Mississippi alluvium deposited over the last 2,000 years (Nixon 1982:34-35).

Soils

As reported by Tandarich and Reagan (1978:8-12) there are four major soil associations in Mississippi county (Figure 7):

Sharkey-Alligator

Soils of this association are nearly level, poorly drained and clayey throughout. Their particle size is small and they are the product of disposition away from natural levees commonly the result of sedimentation in slackwater pools and back swamps. They are found in broad shallow lenses. They are sticky and plastic when wet and crack when dry. Minor soils in this group are Roellen, Tunica, Bowdre, Commerce and Gideon (Nixon 1982). The Sharkey association consists of broad basins and former channels of the Mississippi and Ohio Rivers, the result of clayey sediment deposited in back swamp areas. This association occurs in 33% of the county with Sharkey soils

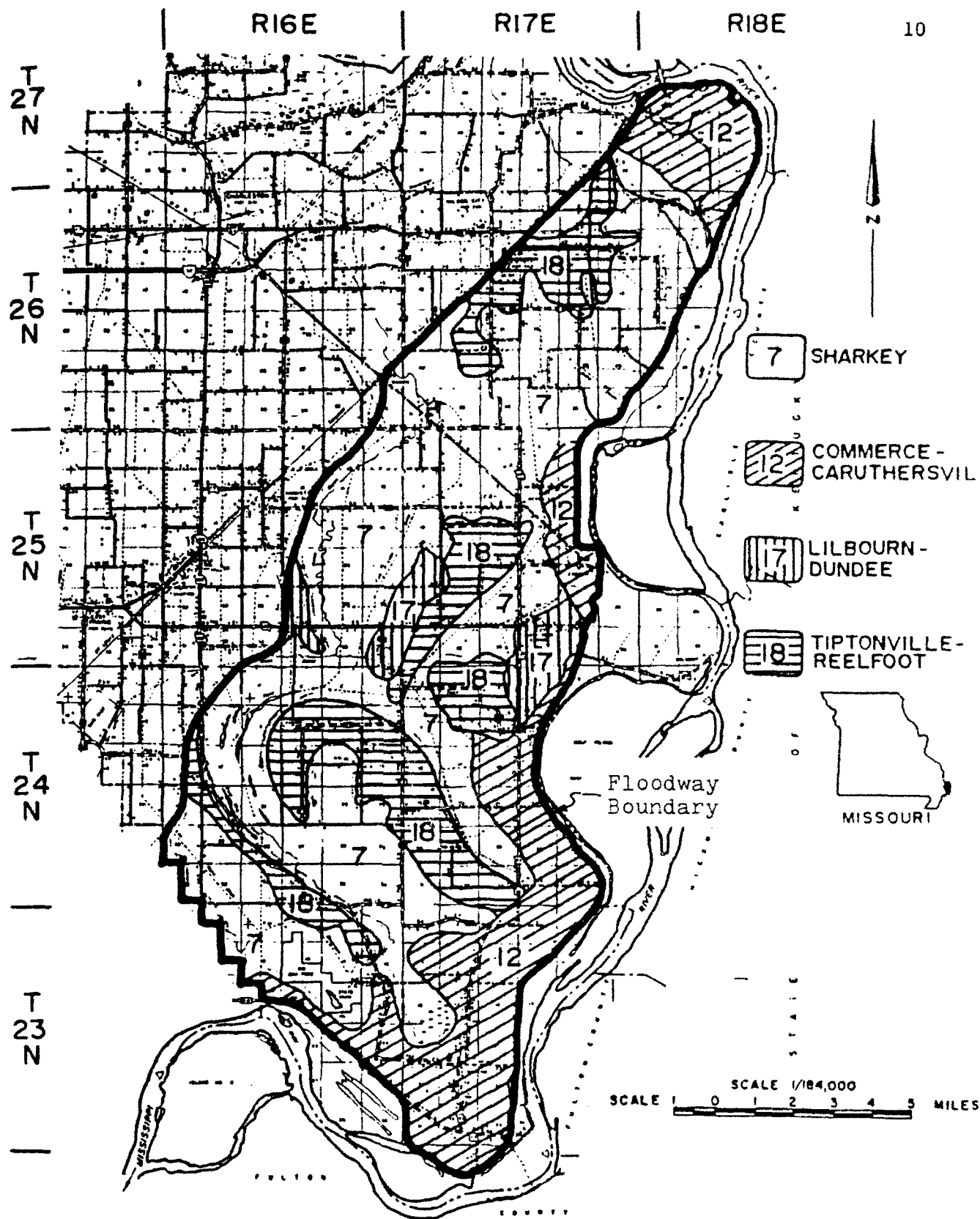


Figure 7. Major Soil Associations within the Birds Point-New Madrid Floodway.
(from Tandarich and Reagan 1978:10)

making up 70% of the association and 30% composed of minor soils: poorly drained Alligator, Roellen, Tunica and the somewhat poorly drained Bowdre soils located in low terraces in broad level areas (Tandarich and Reagan 1978:11)

Commerce-Caruthersville

These soils are found in a 1-3 mile wide strip along the banks of the Mississippi. They are loamy and occur in nearly level patches, the result of relatively recent alluvial deposits. They range from poorly drained to moderately drained. Minor soils in this association include Bowdre, Sharkey, Crevasse, Sikeston, Mhoon and Roellen (Nixon 1982). These are deep, nearly level somewhat poorly and moderately drained soils that formed in recent silty and loamy alluvium. This association borders the Mississippi River the entire length of the county. It occupies 24% of the county. Commerce soils which are somewhat poorly drained occur in slightly depressional areas and make up 52% of the association. Caruthersville soils are moderately well drained and occur on higher natural levees bordering the river channel and old river chutes making up 36% of this association. Minor soils composing 12% of this association are poorly drained Mhoon, Roellen and Sharkey soils in lowlying drains, somewhat poorly drained Bowdre soils on ridges and excessively drained sandy Crevasse soils along the river channel (Tandarich and Reagan 1978:11).

Lilbourn-Dundee

Drainage of these soils ranges from poor in lowlying areas to good on natural levees. Minor soils in this association are Canalow, Jackport, Farrenburg, Commerce and Dubbs (Nixon 1982). These are deep, somewhat well drained soils on nearly level to depressional terraces or natural levees that are loamy throughout. The Lilbourn-Dundee association occupies about 12% of the county (Tandarich and Reagan 1978:11) but it is not present in the study area.

Tiptonville-Reelfoot

These soils are silty throughout and are found on older natural levees. Drainage is generally good. Tiptonville soils are usually at higher elevations while Reelfoot are lower. Minor soils in this association include Bowdre, Dubbs, Roellen and Towosaghy (Nixon 1982). These are deep moderately well and somewhat poorly drained soils on old natural levees. It consists of nearly level to gently sloping soils on higher terraces or old natural levees. The gently sloping areas occur along and around the sloughs and channels adjacent to this association. This association occupies 9% of the county and about 42% is Tiptonville on higher parts of the terraces which are nearly level and well drained. Reelfoot soils on the lower parts of terraces are somewhat poorly drained and make up 38% of the association. 20% is made up of minor soils: Bowdre on ridgetops or terraces on elevations similar to Tiptonville; Dubbs and Towosaghy soils on the highest parts of terraces and

well drained, Roellen soils in low slackwater areas in small areas within and around this association (Tandarich and Reagan 1978:12).

Tandarich and Reagan (1978:15-26) analyzed the 27 soil types described for the county using cluster analysis of major soil attributes thought to be important in cultural activities in order to identify groups of soils which shared characteristics important to aboriginal inhabitants. Based on their similarity in the attributes of surface layer texture, drainage class, surface and subsurface permeability, landscape position, flooding potential and duration, months of flooding, highwater table, natural fertility and organic matter content these sites clustered into 5 Archaeological Soil Clusters (ASC) which the authors feel have greater utility in the prediction of site location than the geographically based soil associations described in the county survey. These are as follows.

Archaeological Soil Class 1 consists primarily of clays soils which exhibit poor drainage, slow permeability, floodplain landscape position, common flooding, high natural fertility, and moderate organic content. The soils in this class are Alligator clay, Roellen silty clay, Mhoon silt loam, Sharkey clay, Bowdre silty clay loam, Tunica silty clay loam, Sikeston loam, Cairo silty clay, Blissett silt loam, Diehlstadt clay loam, and Cooter silty clay loam. ASC 1 contains floodplain soils that flood occasionally or frequently. Roughly 16.5% of the known archaeological sites in the county were located on soils of this cluster which make up 37.7% of total county soils. (The soils in ASC 1 coincide with those reported for the Alligator-Sharkey association.)

Archaeological Soil Class 2 consists primarily of very fine sandy loam and silt loam soils exhibiting moderately good to somewhat poor drainage, moderately slow to moderate permeability, floodplain and natural levee landscape positions, frequent flooding, moderate to high natural fertility, and moderately low organic content. ASC 2 contains soils of the active river channel and floodplain that flood frequently. These are Caruthersville very fine sandy loam and Commerce silt loam. Approximately 11% of the known sites in the county were located on these soils which make up 20.9% of the county's soils. (The soils in ASC 2 coincide with the major soils of the Commerce-Caruthersville association.)

Archaeological Soil Class 3 consists primarily of very fine sandy soils which exhibits moderately good drainage, rapid surface and slow subsurface permeability, floodplain landscape position, rarely floods, low natural fertility, and moderately low organic matter content. This class includes only Steele fine sand, a soil that while located on the floodplain, floods rarely. Only 2 sites (less than 2% of the total known sites in the county) were located in this class but ASC 3 comprises only .2% of the county's soils. This soil is found in such low frequency and so closely associated with Sharkey soils within

the study area that it is not mapped separately on the county soil survey maps (Festervand 1981:48-49).

Archaeological Soil Class 4 consists primarily of loamy soils exhibiting moderately well to somewhat poorly drainage, moderate permeability, natural levee of former river channels and terrace landscape positions, never or rarely flooded, moderate natural fertility, and moderately low organic matter content. ASC 4 soils are located exclusively on old levees and terraces which flood rarely or not at all. These are Bosket fine sandy loam, Dubbs silt loam, Broseley loamy fine sand, Canalow (Clana) loamy sand, Towosaghy loam, Malden loamy fine sand, Dundee silt loam, Wardell loam, Jackport silty clay loam, Lilbourn fine sandy loam, Reelfoot silt loam, and Tiptonville silt loam. 72% of the known sites in the county were located on these soils which comprise 38.4 % of the county's soils. Over 36% (over 47% in the Spillway project area) of these sites were located on either Towosaghy or Tiptonville soils which together make up less than 5% of the county's soils. (ASC 4 contains most of the soils of the Tiptonville-Reelfoot and Lilbourn-Dundee associations.)

Archaeological Soil Class 5 consists primarily of loamy to sandy soils exhibit excessive drainage, rapid permeability, natural levee landscape position, frequent flooding, low natural fertility, and relatively low organic matter content. This class contains Crevasse soils which make up .5% of the county's soils. No archaeological sites in the county have been identified on these soils.

Climate

The project area has a Humid Continental climate but it is subject to maritime influence from the Gulf of Mexico (Bott 1978:2). The effective growing season is approximately 220 days, from late March to early November (Bott 1978:2). Winters are mild and summers warm and humid. Most of the annual precipitation comes in the Fall or Winter with only a small amount of this in the form of snow or sleet. Over a 30-year period precipitation averaged between 33 and 79 inches per year (Brown 1977:67).

Floral and Faunal Resources

Areas near the river channel, and overflow areas including sand bars, were populated with cotton wood and willow; while cypress and tupelo gum were the major species supported in backwater swamp areas which were filled with water nearly year-round (Phillips et al 1951:25-31). Higher elevations such as natural levees and meander belt ridges supported a variety of hardwoods such as maple, oak, hickory, gum, sycamore, ash, box elder, honey locust, hackberry, beech and stands of cane. Dense forests of cypress, tupelo, maple, water oak, pecan, hickory, birch, cottonwood, water ash, and bay populated the overflow areas behind the natural levee but frequent standing water prevented the development of dense undergrowth. The wide, level meander belt ridges and remnants of

the Ohio alluvial fan were covered with a variety of grasses and groves of hardwood trees (Phillips et al 1951:25-31).

Lewis (1973, 1974) has described a model of biotic communities within a portion of the study area developed from U.S. Government Land Office survey notes and plats, historical accounts and ecological studies of adjacent areas (Figure 8).

Cottonwood-sycamore natural levee forest is restricted to natural levees of active river channels, and infrequently inundated. This community was consisted of a sycamore, cottonwood and elm forest with an undergrowth of lianas and cane. This was the habitat of deer, mountain lion, bear, possibly elk, red fox, gray fox, eastern fox, gray squirrel, opossum, raccoon, cottontail rabbit, bobcat and skunk. Birds in the area included paraquets, passenger pigeons and several other gallinaeaceous species.

Sweetgum-elm "cane ridge" forest is widespread in the region, situated on almost any soil except clays or newly deposited lands, inundated only in times of high floods. Dominant plant species were sweetgum, elm and hackberry with a dense cane undergrowth. The Mammals in this region were essentially the same as those found in the Cottonwood-sycamore natural levee forest.

Sweetgum-elm-cypress seasonal swamp is developed in the flood-plain interior on the lower portions of old backslope remnants and other areas in clay soils. The dominant plant species are the same as those in the Sweetgum-elm "cane ridge" forest except for the presence of scattered bald cypress and little undergrowth. Small mammals except for swam rabbits, woodrats and more aquatic mammals probably were present only during the dry season while larger mammals probably wandered in and out of this habitat.

Willow and/or cottonwood water edge brush is characteristic of "newly made" ground along the river and in the interior on the fringes of bayous, swamps and lakes. Willow and cottonwood were the dominant forms and undergrowth was probably limited to vines. Mammals would have included mink, river otter, beaver, and muskrat, and terrestrial animals during drier periods.

Cypress deep swamp is normally under at least a slight sheet of water throughout the year. Bald cypress and water tupelo were the dominant plant species with little underbrush. Larger mammals probably were absent but mink, river otter, beaver and muskrat were present. Some water fowl and fish including buffalo, catfish, fresh-water drum and sunfish were present.

Water millet-lily marsh is found at lake and slough edges. Grasses and aquatic plants were dominant and trees were absent. Waterfowl, aquatic animals, fish, turtle and amphibians occupied this habitat.

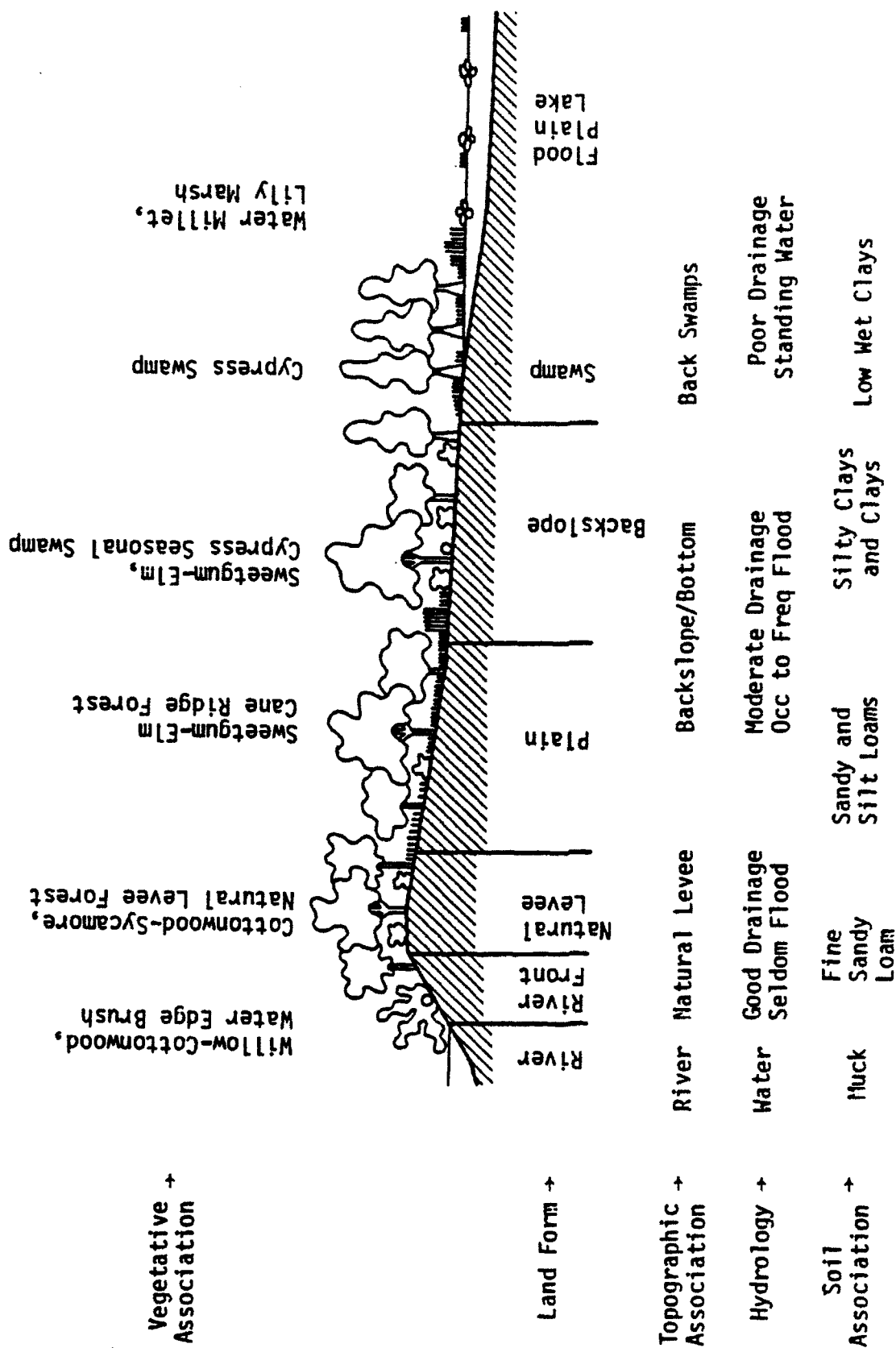


Figure 8. Model of Vegetation, Hydrology, Soil Association and Physiography in the Floodplain.
(from Nixon 1982:20, after Lewis 1974:13,18,35)

PREVIOUS RESEARCH

SOUTHEAST MISSOURI

Prehistoric Research

The first records of aboriginal occupation in the alluvial valley were those of the first European explorers 300-400 years ago but the period from the mid 1800s to ca. 1910 saw the first professional interest (e.g. Squier and Davis 1848, Thomas 1894) in the prehistory of the region. However, it was not until the 1940s that serious professional study of the area began. Since the 1960s a modern professional interest has developed largely influenced by cultural resources legislation, recognition of the complexity of the archaeological record, and efforts to reconstruct regional cultural patterns. Numerous studies and survey reports summarize the history of study in the Lower Mississippi Valley (e.g. Phillips et al 1951, S. Williams 1954, Klippel 1969, J. Williams 1971, Cottier 1974, Greer 1978, Tandarich and Reagan 1978, McNerney 1979, Nixon 1987) and there is no need to reiterate. The result of these investigations is a general cultural sequence for prehistoric occupation of Southeast Missouri.

Prehistoric Cultural Sequence

Early Man (ca. 20,000-12,000 BC)

We do not know how long ago man entered the New World. Some such as Kreiger (1964:68) suggest that human occupation began as early as 40,000 years ago. Adavasio's (1978) work in Pennsylvania indicates that man was present in the eastern United States by approximately 20,000 BP. Presumably occupation in southeast Missouri would have been possible even earlier. If cultural materials from such an early date were present they would be occur within early alluvial deposits such as Saucier's Braided Stream Terraces (Saucier 1974:17) or scoured away by the subsequent meanderings of the Mississippi and Ohio Rivers. Tandarich and Reagan (1978:23) believe that the Braided Stream Terrace 2 described by Saucier which dates between ca. 13,000 and 8,000 BP represents such a deposit. O'Bryan Ridge forming the southern boundary of the study area is a remnant of this terrace. No material dating to the Early Man (Kreiger's Preprojectile Point Stage) period have been reported in this region (Nixon 1982:52-53).

Paleo-Indian (ca. 12,000-8,000 BC)

Little is known about occupation during the Paleo-Indian period (ca. 12,000-8,000 BC) in the research area. Human occupation during this period has been associated with fluted projectile points and a hunting/gathering subsistence pattern exhibiting a heavy reliance on large Pleistocene mammals. Occupation during this period in southeast Missouri is represented by surface finds of fluted, Clovis-like points. Chapman (1975:67) reported the location of single fluted points in New Madrid and in Dunklin County, Missouri. This scanty evidence provides the earliest

example of human occupation in the Cairo Lowlands (Nixon 1982:53). Since Paleo-Indian occupation predates the creation of the present topographic features in the region evidence may be deeply buried beneath within alluvial deposits. The Braided Stream Terrace 2 may contain evidence of this period as well.

Archaic (ca. 8,000-300 BC)

The Archaic period represents an adaptation to environmental changes associated with the end of the Wisconsin glaciation. The shift to a warmer, drier climate and the disappearance of Pleistocene megafauna brought a shift in human subsistence and settlement patterns. The exploitation of wild vegetal products assumed a more dominant role, population increased and adaptations to regional environments develop. (Nixon 1982:53-54). The Archaic is generally divided into Early, Middle and Late subdivisions.

Early Archaic (ca. 8,000-7,000 BC): This period is associated with the Dalton culture. Price and Krakker (1975) report ample evidence of Dalton occupation in the Lower Mississippi Valley. Redfield (1971) has reported Dalton sites in New Madrid County to the southwest of the study area. Diagnostic tools include Dalton, Hardin, Cache River side-notched, Graham Cave side-notched and Big Sandy side-notched projectile points (Nixon 1982:54).

Middle Archaic (ca. 6,000-3,000 BC): This occupation is not well represented in the area and this may reflect an abandonment of the region (Morse 1969). Materials dating to this time are found to the north and west in the Ozark region (Price & Harris 1978:10). There is the potential for recovering material from this period on older landforms such as O'Bryan Ridge. According to Saucier (1974:22) "...the No. 5 meander belt north of Memphis (in which the study area is located) may contain landforms that are anywhere in age from 0 to 6,000 years."

Late Archaic (ca. 3,000-300 BC): Population in the region appears to have increased during this time and occupations were widespread and intensive. Morse (1975:191) even suggests that the first indications of the development of tribal organization may be present. This period is represented by two sites within the project area: Burkett (23MI20) and Weems ((23MI25), located on O'Bryan Ridge. Williams (1954:28) assigns these sites to the O'Bryan Ridge phase characterized by the absence of ceramics, large stem, corner-notched projectile points, fired clay balls (similar to Poverty Point objects), and bannerstones.

Archaic-Woodland Transition (ca. 300 BC-AD 100)

The Woodland period represented by Tchula-Baytown ceramic cultures has its beginnings in a Late Archaic-Tchula transition period dating ca. 300 BC to AD 100. This transition was described as the Burkett phase by R. Williams (1968:176-178, 1971: 187-191, 1974:93-104) and is represented by components of the Burkett and Weems sites. The tool inventory is very similar to that of the O'Bryan Ridge phase with the addition of the first ceramic wares

(Cormorant cord-impressed, Withers fabric-impressed, Mulberry Creek cord-marked), Burkett points and large projectile points with contracting stems. Conical mounds may also appear during this phase (McNerney 1979:4).

Woodland (ca. AD 100-1100)

The Early Woodland associated with Tchula culture is poorly known in the Floodway region. Most Woodland sites in the area are identified as Baytown components thus Woodland is synonymous with Baytown culture in southeast Missouri. The earliest Woodland/Tchula materials: thick, heavy cord marked pottery, sand tempered ceramics are associated with Late Archaic tool assemblages but traits associated with Middle Woodland/Baytown assemblages are usually present on early components as well blurring the distinctions between early and middle manifestations (Nixon 1982:55-56).

During the Middle-Late Woodland/Baytown period mortuary ritual and extensive trade networks become increasingly important. The construction of burial mounds and the interment of grave goods with the dead probably reflect influence from the Hopewellian cultures of Illinois and Ohio (Sears 1964:262). During the Late Baytown period there is an increase in population and settlement becomes more dispersed. This may reflect a shift in subsistence from dependence on the intensive collection and exchange of wild food resources to extensively practiced horticulture (Nixon 1982:56). Williams (1974) and Cottier (1977) present thorough summaries of the Baytown-Woodland period. Williams (1974) recognizes three phases in the Cairo Lowlands:

Ten Mile Pond (ca. AD 100-300)

This phase is represented by the Miller, Jones and Potato Patch sites in the southern half of the Cairo Lowlands. Withers fabric impressed and Cormorant cord marked ceramics (Burkett Phase types) are replaced by sand, clay, or sand-clay temper such as Mulberry Creek cord marked. Clay balls are still present and points are smaller, often corner or side notched.

Barnes Ridge (ca. AD 250-450)

The presence of light concentrations of stamped and zoned Hopewellian style pottery in Middle Baytown assemblages (La Plant site and site 23MIST94) defines this phase.

Hoecake (ca. AD 400-1100)

Named for the Hoecake site in the southeast quarter of the Cairo Lowlands this phase is characterized by clay tempered plain or cord marked ceramics with shell tempering appearing during the Late Baytown-Early Mississippian transition.

Mississippian (ca. AD 1100-1500)

The Mississippian period is characterized by the development of socioeconomic patterns based on intensive agriculture. Cultural traits common to this period are shell tempered ceramics often elaborately decorated, palisaded villages, pyramidal mounds, large concentrated populations and advance sociopolitical organization. Cottier (1977:51-58) recognizes one phase, the Cairo Lowland phase in the study region characterized by triangular points and O'Byam incised, Neely's Ferry Plain, Bell Plain, Kimmswick Fabric Impressed, Wickliffe Incised ceramic wares as well as punctated, impressed, cord-marked and painted ceramics. See Cottier (1977) for a summary of the development of Mississippian culture in this region.

This period is well represented by several substantial sites located within the New Madrid Floodway, immediately to the south of the study area such as Crosno (23MI1) and Towosaghy (23MI2). Both of these are town sites of over 20 acres with palisades and temple mound complexes. Settlements during this period also included villages, hamlets and extractive camps.

Historic Research

Several regional or state histories were published during the late 1880s and early 1900s (e.g. Beckwith 1913, Conant 1878, Douglass 1912, Goodspeed 1888; Houck 1908; Reavis 1878) which provide data on the settlement and economic development of the region. However some the most useful sources are the cultural resource survey reports that have been generated since the 1960s

Historic Cultural Sequence

Houck (1908, Vol.1: 208) reports that historic Shawnee Indians camped in Mississippi County in 1788 but no exact location is given for their camp and little is known about the historic Indian occupation of the area. The French and Spanish who controlled the area at various times enticed the Shawnee and Delaware to settle in the area as a buffer against encroaching Euro-american populations from the north and east. This area came under United States control through the Louisiana Purchase and a series of treaties resulted in the removal of aboriginal populations from the area by 1832 (Douglass 1912:44). Prior to 1800 Euro-american interests in the area focused on trapping, hunting and trading but after 1800 the potential for agricultural development became apparent and there has been a continual growth of agriculture and prerequisite flood control efforts since the mid 1800s (Nixon 1982:59).

Nixon (1982:43-44) divided the historic period into Early and Late phases. The first covers the earliest Euro-american settlement to ca. 1850. During this phase much of the floodplain remained inundated and swampy for extended periods of time and

early historic populations faced the same settlement constraints as their prehistoric antecedents. When the first Euro-american settler came they followed the old Indian trails (Powell 1975:80). The first roads were mostly through woods following the high ridges as much as possible (Swank 1934). Early navigational maps show the location of occasional farmsteads on natural levees along river banks (McNerney 1979:5). According to Kniffen (1971:50) settlements consisted of isolated family groups located on these higher elevations. Kniffen (1971:50) describes Euro-american settlement as one of "...individuals or families living in almost complete isolation...." due to an economic adaptation based on subsistence agriculture, hunting and fishing, trapping, trading and limited exploitation of timber.

In the Late Historic phase, beginning in the 1850s, ditching and levee construction changed the settlement options. Large tracts of swampland were drained and flooding came increasingly under control allowing the occupation of selected lower elevations (Nixon 1982:44). However, in the early part of this phase (late 1800s and early 1900s) settlement patterns in the floodplain were much different than they are today. Overland travel was difficult therefore farm laborers lived on the land they worked and worker's homes dotted the fields. These were located on natural levees and/or on pilings as a precaution against flooding.

Development of the railroads, a lumbering industry, flood control projects and commercial agriculture eventually changed the settlement and economic patterns of the region. With modern mechanization, today's consolidated farms are operated by non-resident owners and a limited number of farm workers who live in nearby towns. This shift in the demand for farm labor has resulted in the abandonment of the homesites previously occupied by farm workers/tenant farmers (Nixon 1982:227-228) and the consolidation of population in levee protected towns and villages.

BIRDS POINT-NEW MADRID FLOODWAY

Archaeological Research

Literature Search

The great majority of sites reported in the literature on Mississippi County are located to the south of the current study area (see Tandarich and Reagan 1978:15-23). Only research that deals directly with the study area will be summarized here.

The earliest sites reported in the county and the study area were mounds. P.W. Norris who was an agent for Cyrus Thomas, director of mound explorations for the Smithsonian Institution, reported three mounds at "Birds Point" but the exact location of these mounds is uncertain (Norris 1883). Historian Louis Houck also sent agents to map mounds and other cultural remains in Mississippi county. Houck (1908, Vol.I:60-62,64) reported the presence of 30 mounds located to the east of the St. Louis Southwestern Railroad

between Wyatt and Birds Point (Tandarich and Reagan 1978:19-22). A major mound complex containing 14 mounds including a large multi-component platform (temple) was described and located in the the vicinity of Rush Ridge Cemetery (T26N, R17E sec. 2&3).

During the 1940s and 1950s the University of Michigan and the Harvard's Peabody Museum collaborated on the Lower Mississippi Valley Survey (LMVS). Stephen Williams and others reported sites in southeast Missouri during this survey locating 6 sites within the current study area (Peabody Museum n.d., S. Williams 1954). Several cultural resource surveys have been conducted in or adjacent to the study area since 1975. These are outlined below.

David Berwick (1978) conducted an in-field survey of Peafield Outlet Ditch the project area (within the current study area) for the U.S. Army Corps of Engineers in 1977. The right-of-way limits extended from station +00 east to station 39+66.96 (the west bank of the river) and from 44 to 70 meters (145-230 ft.) on either side of the channel. No archaeological, historic or architectural sites were encountered within the project areas in the course of this survey.

McNerney and Fischer (1978) conducted another on-site survey for the U.S. Army Corps of Engineers in the area of proposed levee modifications to the Wyatt Berm located within the current study area in Mississippi County. No significant cultural resources were encountered in this survey.

McNerney (1979) conducted a cultural resources literature search for the St. Johns Bayou and New Madrid Floodway project area just to the southwest of the current study area. A sample of 124 recorded archaeological sites was evaluated as a means of making statements about areas within the project area which have high archaeological potential. He examined the distribution of sites in relationship to their distance from water, elevation above sea level, site size, cultural affiliation and site type. He found that 52 % of recorded sites were within 1/4 mile of existing or previous waterways and that 76% were on elevation of 290-310 feet above sea level. The only conclusions reached were the obvious ones: that higher elevations in the project area were high sensitivity zones but that lower elevations may contain undiscovered cultural resources.

Nixon (1982:230) reported the 34 prehistoric sites located along the New Madrid Floodway during a survey of Mississippi River Levee Berm Items for the U.S. Army Corps of Engineers. These ranged in size and significance from a few isolated flakes to a site listed on the National Register of Historic Places. Of these 2 were within the study area (23MI593, 23MI590) and 2 immediately adjacent to it (23MI589, 23MI591). However these sites were considered not to represent significant cultural resources because they did not produce enough material to establish a temporal placement, yielded no evidence of vertical depth, or lacked integrity.

Nixon (1982) also identified 25 historic sites along the New Madrid Floodway levee system, including 23MI592, 23MI594 located just to the west of the project area. These for the most part represent habitations dating in the 1830--1920 range and identified on the basis of surface scatters of historic debris in agricultural fields. The presence of brick fragments, and domestic items suggest most of these were former homesites and occasional finds of horseshoes or harness fragments suggest the presence of outbuildings associated with the maintenance of a farmstead. Generally these homesites are isolated but occasional they cluster to form small communities around local agricultural centers.

In 1978 Tandarich and Reagan (1978) completed a cultural resource literature search of the Mississippi County Spillway Watershed and Peafield Drainage in southeast Missouri which includes the present study area. They reported 92 prehistoric aboriginal and 2 Euro-american archaeological sites previously recorded in various sources and 15 new sites reported by Soil Conservation Service personnel. Seven of these sites were listed on the National Register of Historic Places: Crosno Fortified Village Archaeological site, Hess Archaeological Site, Hoecake Village Archaeological Site, Mueller Archaeological Site, O'Bryan Ridge Archaeological District containing the Burkett and Weems Sites, and Towosaghy State Park Archaeological site. Nine of the total number of sites reported by Tandarich and Reagan, including the Burkett and Weems sites, were located in the present study area.

Prescott (1980) conducted an on-site survey for the U.S. Army Corps of Engineers at the southwest edge of the current study area. No cultural resources were encountered during this survey.

Mark Kross (1981) conducted a cultural resource survey just to the south of the current study area in the vicinity of Belmont for the Missouri Highway and Transportation Department. The only cultural resources located during this survey were a relatively recent frame house; and two bridges of recent construction and common style. No evidence of the historic community at Belmont were encountered. A section of the old Belmont Branch-St. Louis & Iron Mountain Railroad bed was still in evidence.

Sturdevant (1981) conducted a survey of the Mississippi County Spillway Watershed Ditch improvement project areas in 1980. A total of 40 miles on either side of existing ditches ranging from 90 feet to 300 feet in width were surveyed. Evidence of 5 previously unrecorded sites was encountered. Only 23MI145 is located within the current study area.

Site File Search

The site files of the Archaeological Survey of Missouri (ASM) in Columbia, Missouri and the Office of Historic Preservation, Department of Natural Resources (DNR) in Jefferson City Missouri were examined. This site file search identified 31 archaeological sites located within or adjacent to the study area. Four

TABLE 1: Archaeological Site Inventory

ASM# (23MI-)	Name	Cult.*	Type**	Soils\$	Elev.#
	BRP 46	P	c/v	46	310'
579	BRP 47	H	f	42	310'
580	BRP 48	H	f	42	310'
36		U		54	305'
589	BRP 19	P(W) H	v/h hs	33, 37A	310'
24		P	v	47	310'
595	Dugan Effigy	P(W)	v/h	63	315'
38		P		37A	310'
590	BRP 24	P(W)	v/h	37A	310'
591	BRP 22	P(W) (M)	v/h	46	315'
145		P	ls	54	305'
592		H	f	58	315'
601		H	hs	67	310'
602		H	hs	58	310'
20	Burkett	P(A) (W)	c c/v	47	310'
25	Weems	P(A) (W)	c c/v	33, 58	310'
	UR-7	P		33, 63	310'
	UR-8	P		54, 37A, 46	310'
	UR-11	U		37A, 59	310'
543		P(A) (W) (M)	c c/v c/v	33	310'

TABLE 1: Archaeological Site Inventory

ASM# (23MI-)	Name	Cult.*	Type**	Soils\$	Elev.#
22	Goodin	U		46	315'
528		U		46	315'
139	HS#4	H	hs	42	310'
140	HS#5	H	hs	65, 42	315'
534		U		42	305'
531		U		65, 37A, 58	315'
532		U		63	315'
593	BRP 58	P H	ls hs	63, 58	310'
594	BRP 23	H	f	42	305'
	UR-1	U		41A	310'
136	HS#1	H	hs	41A	315'
137	HS#2	H	f	42	310'
37		U		42	310'
533		U		58, 59,	310'
138	HS#3	H	f	42,	315'

Key:

- * U = unidentified, P = prehistoric, H = historic,
A = Archaic, W = Woodland (Baytown), M = Mississippian
- ** c = camp, h = hamlet, v = village, ls = lithic scatter,
hs = historic scatter, f = residence/farmstead
- \$ Soil Conservation Service soil map units (SMU) (Festervand
1981:23-52)
- # highest elevation

MISSISSIPPI.

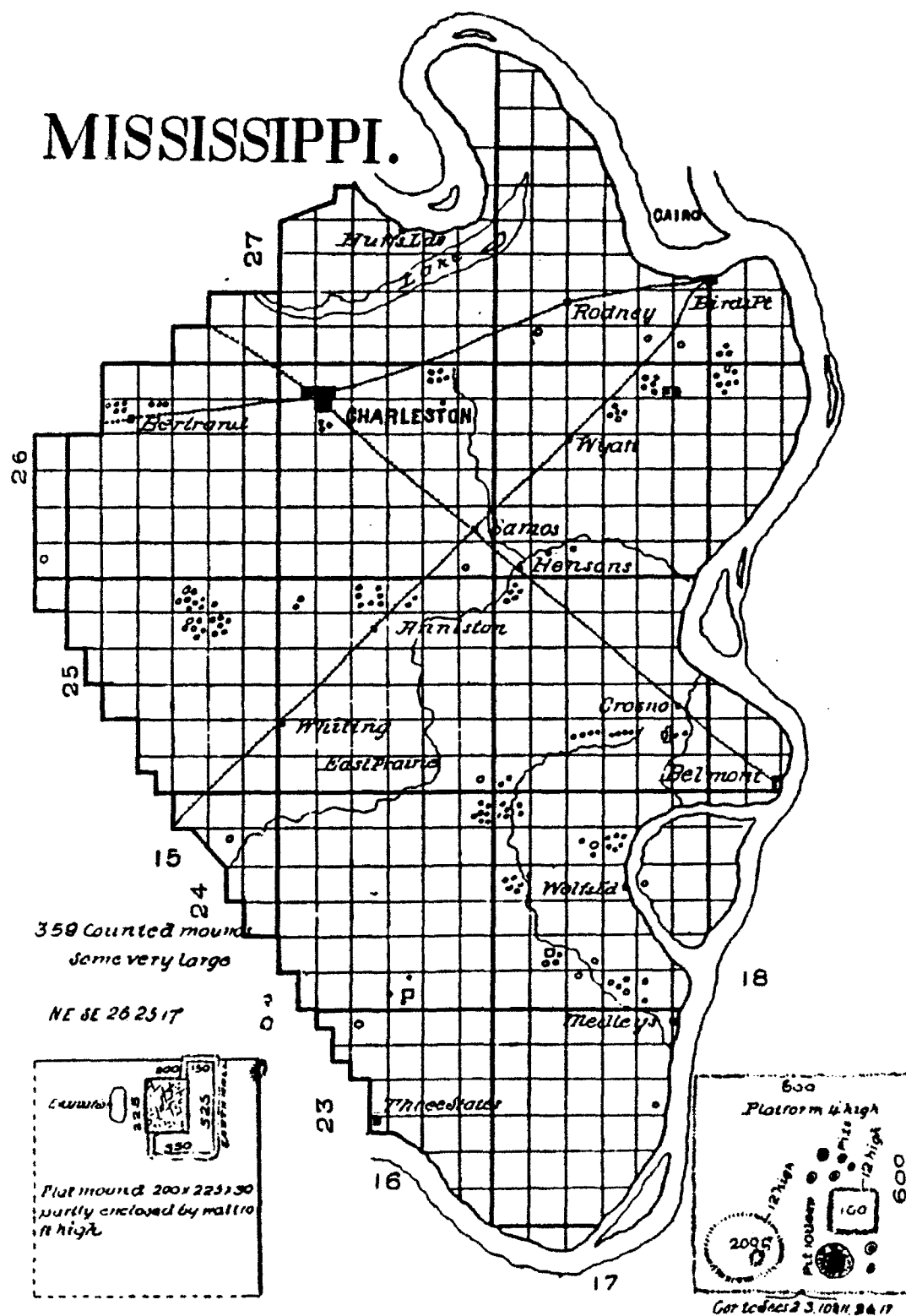


Figure 9. Mound Locations in Mississippi County.
(from Houck, Vol.I:61)

additional sites, not in the ASM sites files, are located in this area according to Tandarich and Reagan (1978) for a total of 35 sites (Appendix B) representing 42 cultural components. These are listed in the inventory (Table 1). Two archaeological sites and one archaeological district within the study area are listed on the National Register of Historic Places. These are the Burkett Site (23MI20), the Weems Site (23MI25) and the O'Bryan Ridge Archaeological District, all located on O'Bryan Ridge at the southern boundary of the study area. All sites located within the study area and in adjoining quarter sections are included. Houck (1908: 61-64) also recorded the location of numerous mounds within the study area (Figure 9). Some of these locations (Table 2) correspond with sites listed in the ASM and DNR files.

TABLE 2: Mississippi County Mound Sites

Site	Cult.	Type	Soils
14 mounds incl. 1 platform md.	P(M)	t	63 Tiptonville 54 Reelfoot
4 mounds	P(W/M)	t/v	63 Tiptonville
mound	P(W/M)	t/v	55 Roellen
mound	P(W/M)	t/v	58 Sharkey 33 Alligator
7 mounds	P(W/M)	t	58/59 Sharkey
4 mounds	P(W/M)	t/v	41A Caruthersville
mound	P(W/M)	t/v	?
mound	P(W/M)	t/v	?

Historic Settlement

Developmental Sequence

Betty Powell's (1975) History of Mississippi County is the primary source on the history of the study area but there is a great deal of information available from cultural resource reports, local newspapers, historic maps and local informants. The following sequence of settlement and economic development within the Floodway appears to fall into three phases (rather than two as described by Nixon 1982).

Early Historic (ca. 1800-1850)

Euro-american patterns of land usage approximate those of the earlier aboriginal populations of the region. Population is found in dispersed communities along the river or on the highest elevations along ridges and old levees.

Late Historic (ca. 1850-1937)

Development of drainage and transportation systems in the region begin to give Euro-americans some control over their environment increasing land available for settlement and farming. Many small communities rise and fall during this phase. It is a dynamic period of continuous growth and change.

Modern (ca. 1945-present)

Modern flood control, and mechanization have permits the cultivation of over 90% of the land within the Floodway and development of a thriving agricultural industry. Most of the population resides in nucleated settlements outside the Floodway.

At the beginning of the Early Historic phase, prior to 1803, Americans had been induced by the Spanish to settle west of the Mississippi river by granting liberal tracts of land in return for their agreement to become Spanish subjects. The first (permanent Euro-american) settlement in the county seems to have been made in 1800 by John Johnson who obtained a grant of land and built a house on or near Bird's Point. The following year Edward Mathews and his five sons settled on what is now known as Mathews Prairie. Over the next few years other settlers arrived and in 1805, Abraham Bird settled on and developed the land previously occupied by John Johnson. He remained here until the flood of 1814-1815 (Goodspeed 1888:303-304).

In the early 1800s the beginning of steam boat navigation on the Mississippi River created a large demand for wood for fuel. As a result many wood yards were established along the river (Powell 1972:67). River transportation was the principal mode of transporting goods prior to railroad construction.

By 1803 sovereignty had passed to the United States through the Louisiana Purchase. The population of the Mississippi county area was only 100 in 1810 and increased very slowly until 1830. Norfolk was the first town laid out in 1836 and Charleston was established in the following year. These were the only villages in the county until 1845. Missouri was granted statehood in 1821 and in 1845 the southern portion of Scott County was annexed to form Mississippi County. Charleston eventually became the county seat (Powell 1975: 52, 89).

During the Civil War, headquarters for the Tenth Regiment Iowa Volunteers were located at Bird's Point (Powell 1975:159). However, conflict within the study area was limited to sporadic guerrilla activity. One skirmish reportedly took place near Bird's Point on August 19, 1861 but the exact location is unknown (Powell 1975:236-238). The battle of Norfolk was actually fought near Brewer Lake. This skirmish occurred the day before the battle of

Belmont at a place called the sink hole, two miles south of the old (Rush Ridge) school and church yard (Swank 1934). Rush Ridge cemetery included two Civil War stones marking the graves of two soldiers killed during the battle near Norfolk (Anderson 1987c).

Transportation was an important constraint on Euro-american settlement which at first was concentrated along the river between Birds Point and Norfolk. At one time there were mansions all along the river in this area. Some of these burned and others have been destroyed by the river (Feezor 1987: p.c.).

From 1845 to 1855 many plank roads were built in an effort to overcome the obstacle of swampy areas. They were unsatisfactory and did not last long but they kept travelers from being mired down in mud. In 1857 a 25 mile plank and gravel road was planned from Charleston to Belmont. Ca. 1870 there were seven main roads in the county.

After the Civil War development of the railroads improved communication, transportation, and commerce in the region. Railroads important to the development of the study area were: (1) the Cairo, Arkansas, and Texas ("CAT" Line); (2) Belmont Branch built by St. Louis and Iron Mountain Railroad; (3) Cotton Belt built by the St. Louis-Southwestern Railroad Company (Anonymous 1971). These railroads criss-crossed the county (Reavis 1878:1, Reagan 1978:18). This was the way many people came to shop and some high school student came to school. Portions of the abandoned beds of these railroads are still in existence.

Paved roads started to usurp the place of the railroads. As the network of paved roads spread across the county local rail lines declined. Charleston lost its roundhouse in 1924 and train service to the Belmont Branch except for switching was abandoned in 1927 (Powell 1975:80).

Severe drainage problems resulting from periodic flooding by the Mississippi River limited growth within the floodway area until the turn of the century. Levee building with mule scrapers did not begin locally until 1909-1910 (Anderson 1987a). By the mid 1920s corn had become the staple cash crop augmented by livestock, wheat and oats but flooding remained a constant problem. In 1859 the first levee, 30 miles long and costing \$100,000, was built. The first frontline levee was much lower and smaller than the present one. Still, in 1878 for every acre under cultivation there were still approximately two under water (Powell 1975:31, 53). In the early 1890s lumber companies began to clear the forests in the region and this deforestation was coincident with efforts at improving drainage and land reclamation. Drainage districts were organized and levees were built to create and protect new agricultural lands (Powell 1975:34-39).

In 1893 a bill was introduced to the Missouri legislature calling for the survey of swamplands and eventual reclamation of lands by a series of levees and ditches to be built in cooperation with the state of Arkansas. The survey was started but the legislature

failed to provide money to continue the project. Drainage districts were already being formed on the local level by 1892 and had already constructed some levees and they now expanded their efforts to include ditching. By 1901 six ditching districts had been established in Mississippi County and they were responsible for the completion of six ditches draining 239,392 acres. By 1910, 1700 miles of public ditches had been dug (Powell 1975:34-39).

Improved drainage and steam power made the exploitation of swamp forests possible and these were decimated by the early 1920s. On the other hand deforestation prompted the expansion of agriculture and increasing sophisticated farm equipment increased the areas farmers could profitably use. However, flooding remained a major problem into the 1920s. After the great flood of 1927 the resulting outcry for flood protection brought federal response in the form of the Jadwin Floodway Plan enacted into law in 1928 as a part of the Mississippi River and Tributaries Project. This plan provided for a setback levee to be constructed 5 mile back (landward) from the main river levee with the additional proviso that, if the Mississippi River reached 66 feet at the Cairo, Illinois gauge, a hole was to be dynamited in the main levee to allow floodwaters to escape through the Bird's Point-New Madrid Floodway. The floodway has been put into operation only once during the January of 1937 when heavy rain created extreme flooding on the Ohio and Mississippi Rivers (Tandarich and Reagan 1978:35).

At the time, according to Gov. John Ashcroft, the floodway area was still primarily undeveloped timberland (Anderson 1987b). Since that time a great deal of time and money have been invested in agricultural development of the land within the floodway so that now the merits this plan are being hotly debated by local residents who fear severe economic loss should the floodway be placed in operation in the future. Ashcroft states that, "The socio-economic environment of that portion of Southeast Missouri has changed dramatically in the last four decades. Much of the floodway land now has been cleared, drained and improved and represents one of the most productive and important agribusiness areas in our nation" (Anderson 1987b). As a result of public pressure the Corps has modified the plan allowing for natural overtopping of the levee prior to determining the necessity to crevasse the front levee but local residents are not satisfied and are demanding Federal study of alternate solutions and abandonment of the floodway plan.

Location of Historic Settlements

During the 1800s several communities grew up along transportation routes, either along the river or on higher elevations. Although many of these communities were abandoned by the early 1900s there is a high probability for the occurrence of archaeological sites representing the remains of these settlements in certain localities within the study area. A description of these localities follows.

Shoreline Settlements

Settlements grew up along the riverfront as the Mississippi was the main transportation artery in the region. Feezor (1987: p.c.) reports that there were mansions all along the river front at one time. According to Ben Bird Moore (1987: p.c.) there were more amenities along the river due to the ease in transporting goods to these settlements. The major riverfront settlements were Birds Point and Norfolk Landing.

Birds Point

Abraham Bird received a land grant from the Spanish government in 1789 for "191A Certificate 2230, Township 27, Range 17 & 18 on the Mississippi River opposite the mouth of the Ohio" (Figures 10 & 11). The area was also settled by John Johnson under a Spanish grant in 1800 but he later sold this land to Bird (Powell 1975:158).

This community was one of the first in the county. It had rail lines coming from Charleston and East Prairie, which were linked to Cairo by ferry. Many people in the northern end of the county would board the trains and take the ferry to do their shopping in Cairo which was easier than trying to get to Charleston. It was a substantial community at one time with stores, homes, a hotel and restaurant. George Kenrick erected a hotel here in 1859 and by 1879 there were two boarding houses,, two saloons, a grocery store, a blacksmith shop and a saw mill. But by 1880 erosion was becoming a problem and in 1884 a tornado destroyed eighteen houses. Another cyclone in 1896 practically destroyed the town and it was never completely rebuilt. In 1905 a fire destroyed much of the remaining town and its act of incorporation was taken away by the county court. These are all gone now, covered by river silt or washed away (Anderson 1987c). Powell 1975:158-160). Feezor (1987: p.c.) reports that some of the foundations of still present at the location of this community (See Figures 10 & 11).

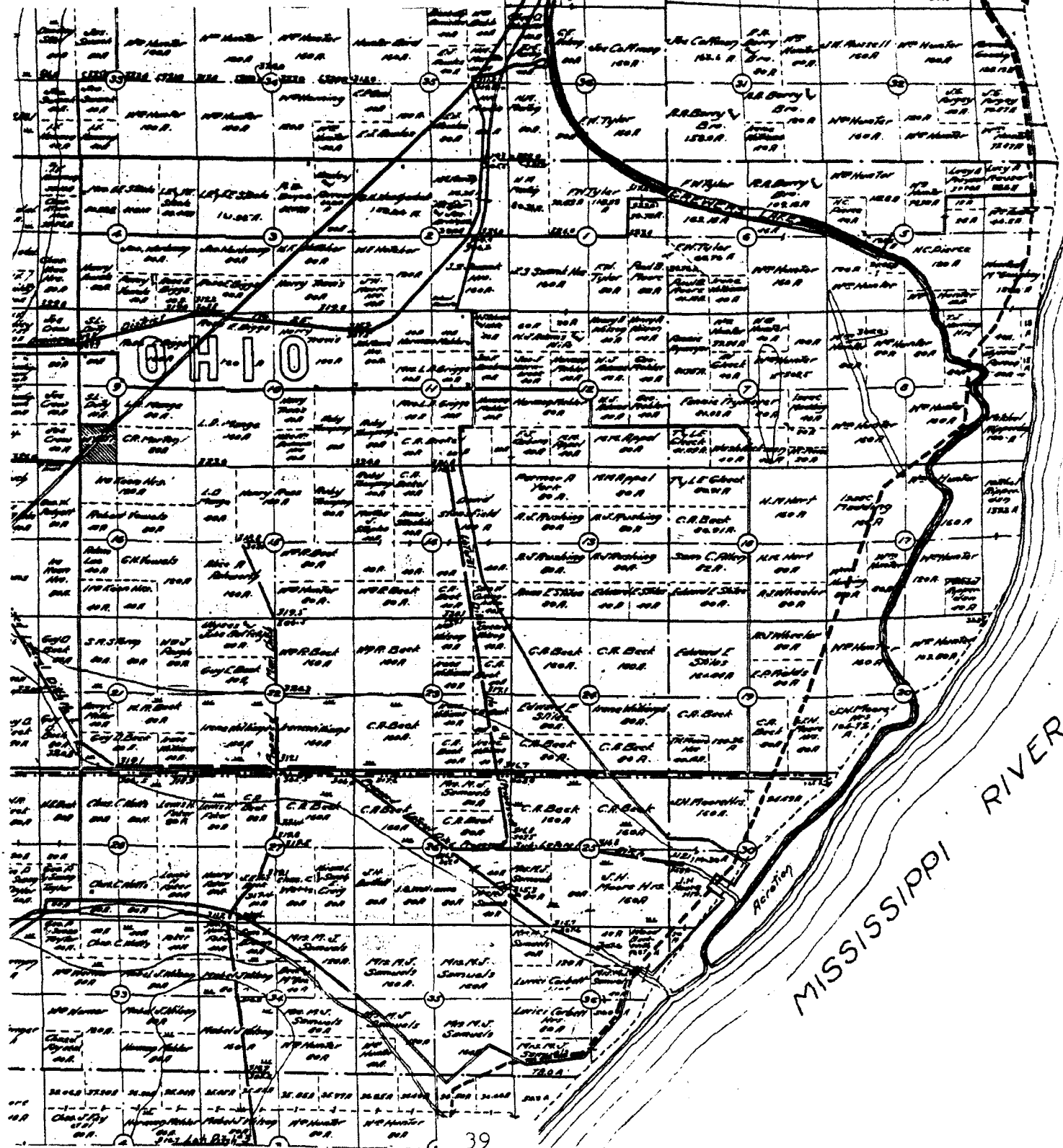
In the 1860s Steamboats stopped at Birds Point to take on grain and wood and in 1961 there was an encampment of Union soldiers here (across from Grant's main force at Cairo) (Anderson: March 19, 1987). According to an article in a German-American newspaper ca. 1861, Colonel Schuttner with a regiment of volunteers occupied Bird's Point and set up camp there in order to prevent the Southern troupes from launching an attack from this place on Union troupes at Cairo across the river (Moore 1986).

Birds Point is described as follows: "Bird's Point forms an area along the river 1 1/3 mile northwest to south which includes a circular clearing, a forest encircled farm, a hotel presently occupied by the regimental staff and a hospital, a beautiful house occupied by Mr. Bird, a railroad station of the Cairo and Fulton Railroad, and number of negro cabins. This little village-plateau lies directly opposite the mouth of the Ohio and the contact with Cairo is through a ferryboat that makes about four



Figure 10. Study Area as shown on Map of Mississippi County, Missouri 1883

Figure 11. Study Area
as shown on Map of
Mississippi County,
Missouri 1911.



trips daily. The camp at Bird's Point is defended by trenches and breastworks and protected by two batteries" (Moore 1986).

In 1895 Bird Point was a thriving village of 400, located on the Mississippi 12 1/2 miles east of Charleston. It was connected to Charleston by the Cairo branch of the Iron Mountain Railroad and to Cairo by ferry. The Cotton Belt Railroad also had a terminus here and both railroads entered Illinois via transfer boats. (Enterprise-Courier 1949, Powell 1975:75). By 1894, three transfer boats were needed to handle rail business between Bird's Point and Cairo. In 1905 the Iron Mountain and Cotton Belt Railroad had to abandon Bird's Point as a river crossing because of the constant crumbling of the river banks and relocate their yards and incline at Norfolk (Powell 1975:76-77).

Although this community was literally washed away by the river it was a hub of commerce and transportation for over a century and settlement was spread out all along the northern riverfront. A map published by the Board of Examination and Survey of the Mississippi River in 1908 shows the location of residences within the levee, north of the present location of Tom's Blue Hole. The occurrence of historic sites within the study area in the vicinity of Birds Point is a high probability.

Norfolk

This is presently a port site. It was once a thriving community. Norfolk was the first town laid out in Mississippi County (1936) and is the first listing in Plat Book No. 1, page 1 (Powell 1975:154). The first store serving the Rush Ridge community was at Norfolk Landing, seven miles down the river from Cairo, Illinois. It was used as headquarters for the Union soldiers during the Civil War (Swank 1934). Ca. 1862-1863 Isaac L. Harrel was authorized to keep a public ferry across the Mississippi River at the village of Norfolk to the head of Island No. 1 on the Kentucky shore (Powell 1975:70).

In 1859 it was described as a pleasant little village on the river five miles below Cairo. It was the shipping point for a large portion of the county including Rush's Ridge but seems to have disappeared by 1895 (Powell 1975:153-154).

Ridgetop Settlements

O'Bryan Ridge

O'Bryan's Ridge was well populated in the 1800s as this was one the highest elevations in the region. Although there is no sign of them today, there were a number of homes on O'Bryan's Ridge and among the largest was that of the Hunter family who settled here in the early 1800s (Anderson 1987a).

The first known settler seems to have been a Col. O'Brien who established a plantation before the Civil War. He built his house and farm buildings near the river and when the river started

eroding the bank the house was jacked up and moved to its new location. His unmarried daughter Mattie seemed to own this 1600 acre farm in 1910 (Powell 1975:167-168).

I.P. Barnard had also settled on the western edge of the ridge before the Civil War. His farm was eventually sold to Bill Beck. The Becks were the forerunners of the half dozen or so families who settled on the ridge ca. 1910. Some of the family moved onto some of the Barnard land in the 1890 and others acquired the McGee place. Still another family settled in Dirk about 1902 (Powell 1975:168).

The Corbetts from Tennessee settled on the north edge of the ridge not far from the river, possibly before the Civil War. Their buildings, including a one story house and the family graveyard, were located far enough back from the river to be behind the levee when it was built. They also farmed land on the island opposite them, known as the "tow head" (Powell 1975:169).

In 1885 George McGee moved his family from Kentucky to O'Bryan's Ridge. When they arrived practically the whole country was woods. In the 1880s and 1890s settlers going west with covered wagons used the trail past their house. The McGees established a cemetery on their property about 1/4 mile east of their house on a slight knoll that was probably the remains of an Indian mound (Powell 1975:170-171).

Watt's Corner was located directly south of Wyatt, near where "O'Bryan" is on the map (Anderson 1987c). According to Powell (1975:167-168) Watt's Corner was located 2-3 miles directly south of Wyatt, where a gravel road leaves the blacktop and runs directly east. In 1910 Charles Watt and his family settled on a 400 acre rectangle (the old McGee place) lying 1/2 mile east of Watt's Corner that he had purchased the year before from Clint Beck. Several families from Indiana, all friends and neighbors of Charles Watt, followed and settled near Watt's Corner (Powell 1975:167-171).

Great floods in 1912 and 1913 broke through the levee and inundated the ridgetop. When this was followed by localized droughts in 1914 and 1915 the community on the west end of the ridge was gradually abandoned (Powell 1975:184-188). According to Robert Watt who revisited Watt's Corner in 1963, "Even the topography is practically unrecognizable from sixty-three years ago, largely because of the leveling of the county by the deposit of silt. The site of the large modern house my father built is only recognizable by the pump and the two cement steps which led to our back porch" (Powell 1975:167). The location of many of these early farmsteads can be approximated from early maps (See Figures 10 & 11).

Rush's Ridge

Rush's Ridge was established November 1836 and was the first town laid out (if not platted) in the county. It had a church, several

stores, and a saddle shop in 1859 but also seems to have largely disappeared by 1895 (Powell 1975:154).

Rush's Ridge was settled because of the rich fertile soil here and its' proximity to the Mississippi River which was important for transportation. The Ridge runs east of Wyatt to within two miles of the Mississippi River at Norfolk. There were Indians in the area when the first settlers arrived. Although they were friendly little is known about them. An Indian mound was located on Albert Naive's place (formerly own by Alfred Rush, William's son). The contents of this mound are now in the Beckwith collection in Cape Girardeau (Swank 1934).

The Ridge received its name from William Rush who came from Kentucky and settled here in the Spring of 1816. According to Joan Feezor (1987: p.c.) William Rush came here first with the Lewis & Clark survey and the Rush's settled here in 1810. The first settlement made on Rush Ridge was where the L.E. Griggs home now stands (see Map). the first houses were built of logs, usually one large room with a large open fireplace. Barns were also constructed of logs and fences were of split rails. In 1934, the house now owned by Mrs. E.F. Rafferty was one of the oldest. It has been modernized but the original logs were still there.

John Smith who was L.E. Griggs' grandfather came down the river on a flatboat from Kentucky and landed at Norfolk in the fall of 1852. He bought the original Rush homesite and built a new home there using lumber he brought with him. The first church in the community was a log house which stood where the Rush Ridge cemetery is now. This church was eventually moved to Wyatt. The church that now stands there belongs to a Black congregation and may have been moved there from another location after 1937. The Methodists built a church one mile north of the original church. It was abandoned when hard roads made it easier for people to go to Charleston.

The Rush Ridge cemetery has been in use since at least 1859 and the Allen cemetery (to the east) even longer. The Allen cemetery was the first Rush cemetery. A mound was located across the field from Allen cemetery to the northwest and to the east of Rush Ridge cemetery (Feezor 1987: p.c.). Two soldiers who died in Battle of Norfolk were buried in the (Rush Ridge) church cemetery (Swank 1934). The Griggs family has a private cemetery on the old home place one mile south of the Rush Ridge cemetery. The first store in the community was at Norfolk Landing. The first school house was 18 x 20 feet, built of logs on land donated by Isac Smith near the old church yard where the colored school now stands (Swank 1934).

The location of this settlement is fairly easy to reconstruct since some of features such as cemeteries and the original Rush Road School are still in existence. There is a very high probability of historic site occurrence on Rush Ridge.

Transportation Routes

Difficulty in transportation was a limiting factor in settlement of the study area and settlements tended to grow up along transportation routes (See Figures 11 & 12).

There were seven major roads in the county ca. 1870. These early roads usually followed ridgetops as much as possible. One road branched off the Charleston-Belmont Road and passed by O'Bryan's Ridge to the Mississippi before it turned south to Belmont. Two roads led from Charleston to Cairo. One went north from Charleston through Big Lake and then east and finally southeast to Greenfield's Landing (north of Birds Point). The other ran due east from Charleston to Bird's Point then one branch went to Bird's Point and the other to Greenfield's Landing (Powell 1975:80-83). In 1926 a plank bridge was constructed on Brewer's Lake by the present bridge site (Feezor 1987: p.c.).

The construction of railroads opened up communication in the study area as in the rest of Mississippi County. Three rail lines criss-crossed the study area in the late 1800s. The first ran from Poplar Bluff northeast through Charleston to Birds Point and thence to Cairo. This line was completed between Bird's Point and Charleston by 1859 and continued toward Poplar Bluff until 1861 when construction was interrupted by the civil war. After the war it was taken over by Thomas Allen and Associates who changed the name from the Cairo & Fulton Railroad to the "CAT Line" and the line was rebuilt and completed to Poplar Bluff by 1873 (Powell 1975:74).

The second railroad ran northwest-southeast connecting Belmont and Charleston to points west. Construction of this rail line had been started before the war by the Iron Mountain Railroad between St. Louis and Pilot Knob. After the war the Iron Mountain Railroad was renamed the St. Louis-Iron Mountain Railroad. This railroad company completed the Belmont Branch from Charleston to Belmont in 1869 (Powell 1975:72-74).

The last rail line ran southwest-northeast from East Prairie through Samos and Wyatt to Birds Point. By 1883 the St. Louis-Southwestern Railroad line, the Cotton Belt narrow gauge railroad, extended from East Prairie through "Hunter's Station" at the Hunter Farm, terminating at Birds Point for transfer by ferry to Illinois (Anderson 1987a). However there was no depot here until 1911 (Powell 1975:77). The town of Wyatt grew up to the southwest of Hunter's Station (Figure 10).

CULTURAL RESOURCES

PREHISTORIC RESOURCES

Archaeological Sites

The literature search and site file review identified 15 prehistoric sites comprising 18 cultural components within and adjacent (within 1 mile) to the study area. These include 3 Archaic, 7 Woodland, 2 Mississippian and 7 unidentified prehistoric sites. Two of these the Burkett Site (23MI20) and the Weems Site (23MI25) and the O'Bryan Ridge Archaeological District are listed on the National Register of Historic Places. In addition, 10 sites which could not be identified or placed chronologically were located in this area. It is likely that most of these are prehistoric sites as well. (See Appendix B for exact locations of these sites.)

All of the known prehistoric sites are located on six soil classes: Alligator silty clay (SMU 33), Bowdre silty clay loam (SMU 37A), both of which are included in Tandarich and Reagan's ASC 1, Dubbs silt loam (SMU 46), Dundee silt loam (SMU 47), Reelfoot silt loam (SMU 54), or Tiptonville silt loam (SMU 63), included in ASC 4. All of these soils are associated with ridges, terraces and natural levees.

The small number of Archaic components was expected since Tandarich and Reagan (1978) also found that they seemed to be underrepresented. The lack of Archaic sites may mean that the area was largely unoccupied during this cultural period or that the landforms occupied by Archaic peoples have been substantially altered or buried. It is possible that the unidentified sites and lithic scatters actually represent Archaic components. Archaic points frequently occur in the local collections. All Archaic sites are considered to represent seasonal or temporary camps.

The most numerous sites are those from the Woodland/Baytown period. These may represent temporary camps or more sedentary hamlets or villages. Mississippian sites also seem to be grossly misrepresented given the great number of Mississippian components reported for the rest of the county and the fact that Woodland and Mississippian sites tend to be found in the same locales. This is probably the artifact of the lack of any systematic archaeological investigation of the study area. It is known that Beckwith "dug mounds" and collected in this area and historic sources often refer to mounds. Houck reported at least 30 mound locations in or adjacent to the study area and one of these was a complex of 14 mounds including a large multi-level platform mound (Houck 1908: 61-64). Although some of these mounds may have been Woodland many were probably associated with Mississippian town and village sites. Reported mound sites cluster in the vicinity of Rush Ridge and Brewer Lake (See Figure 9).

HISTORIC RESOURCES

Archaeological Sites

The literature search and site file review located 13 historic sites within or adjacent to the study area (See Appendix B for exact locations). Six of these were identified as residences or farmsteads. The remainder were historic scatters primarily of glass and ceramic sherds. Those for which dates are available were occupied prior to ca. 1920. These are all located along the periphery of the study area as they were discovered during surveys associated with levee improvements. A number of these sites are located along the river north of Norfolk Landing as expected from the history of settlement in the area but there is no information from Birds Point, Rush Ridge or O'Bryan Ridge, areas known to have been settled early in the history of the area. All of the known historic sites are located on the following soils: Caruthersville very fine sandy loam (41A), Commerce silt loam (SMU 42), both in ASC 2, Sharkey clay (SMU 58/59), Tunica silty clay loam (SMU 65), both in ASC 1, Orthents (artificial levee/ water complex).

Local informants (Liz Anderson, Joan Feezor, Hazel Williams and Ben Bird Moore) provided information on the possible location of several historic archaeological sites and/or architectural features. These are listed below and shown on Figure 12.

A possible homestead (Fig. 12, #1) was located in T27N, R18E, sec. 29 SW1/4.

A log cabin (Fig. 12, #2) was located in T27N, R18E, sec. 31. This structure may still be standing.

Judge Barry's house (Fig. 12, #3) was located in T27N, R17E, sec. 36 NE1/4, NW1/4. This was a turn-of-the century two-story house surrounded by a fence in a vernacular Queen Anne style. It has burned down.

The John Marable house (Fig. 12, #4) was located in T27N, R17E, sec. 11 NE1/4 and the original Griggs homestead (Fig. 13, #5) was in sec. 11 SE1//4, NW1/4

A pre-1887 farmstead (Fig. 12, #6) was located on a mound in T27N, R17E, sec. 1 NW1/4, SW1/4. It has burned except for the barn which is still standing on top of the mound.

The locations of several structures within the study area are shown on the Map of Mississippi County 1883 (See Figure 10).

Architectural Features

There are not too many houses left in the study area that predate 1937 but here are a few (See Figure 12).

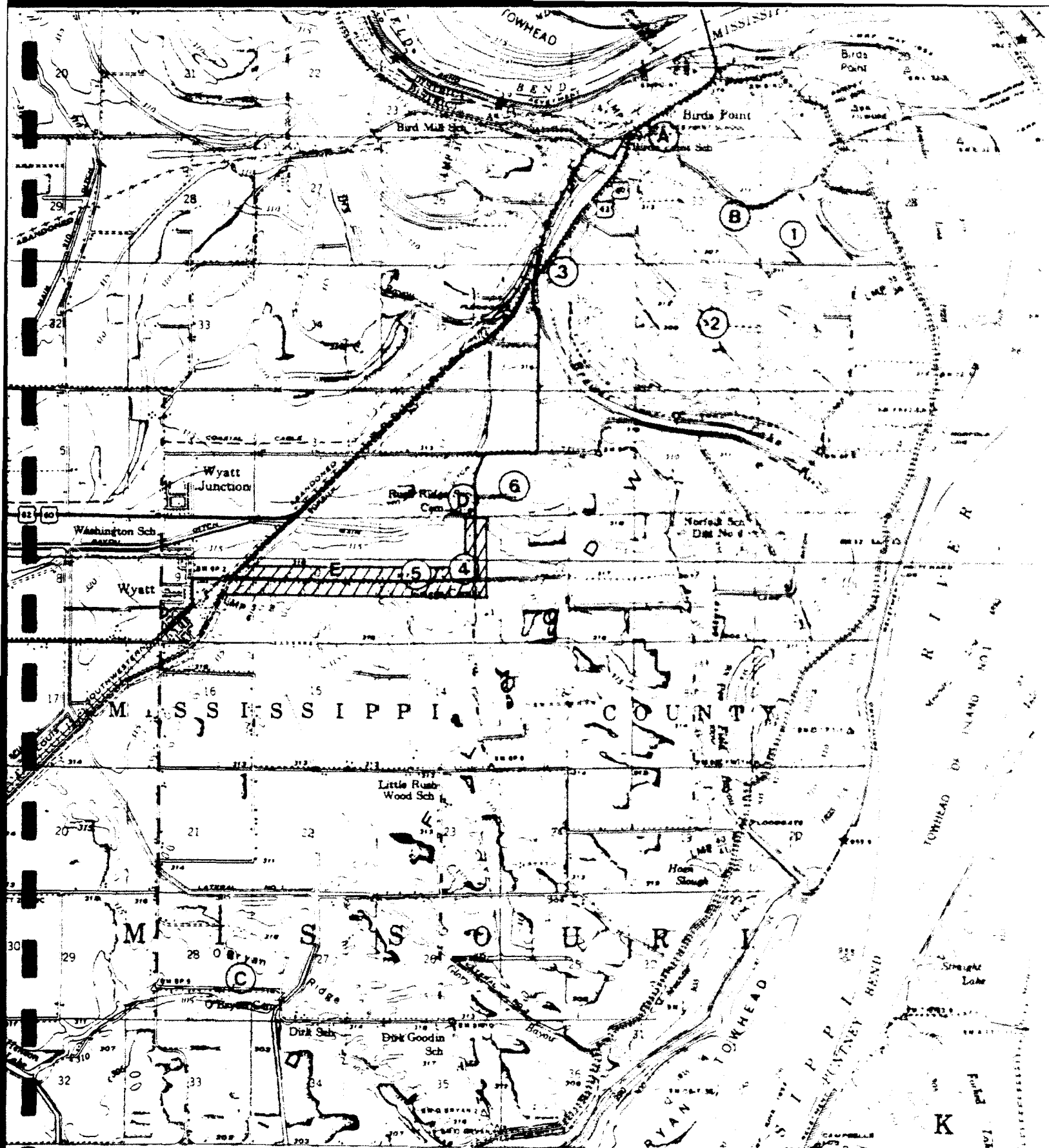



Figure 12. Locations of Historic Sites and Structures

- 1-6 = Historic Sites
- A-D = Historic Structures
- E  = Old Route 60

A Bungalow owned by Karl Myers (T27N, R18E, sec. SW1/4) reportedly dates to the turn of the century (Fig. 12, A).

The Byrnes house (T27N, R18E, sec 30 C, E1/2) constructed in a Gothic vernacular style is reported to date prior to 1937 (Fig. 12, B).

The John Tatum home (owned by C.E. Stouffer) (T26N, R17E, sec 28 NE1/4, SE1/4) is also said to date to before 1937 (Fig. 12, C).

The original Rush Ridge school house (T27N, R17E, sec. 2 SW1/4, SE1/4) is still standing and is now in use as a home (Fig. 13, D).

Old Route 60 was the first concrete rural road built in the state. It still exists and is in reasonably good shape. Completed in 1921, it wandered from Charleston to Wyatt and from there to Birds Point. Part of it was used as a base for the new Route 60/62 but a portion of it is still the old red granite concrete and is very well preserved (Anderson 1987c, Powell 1975:83). The preserved portion also follows part of one of the original roads in the county dating to at least 1883 (Fig. 12, E).

Cemeteries

While these do not fall into the category of architectural features or archaeological sites, marked historic cemeteries do constitute cultural resources and are protected under recent Missouri State legislation. It should be noted that although these often have some extant grave markers they usually contain unmarked graves and the boundaries of historic cemeteries are often unknown. Thus "known" historic cemeteries located within the study area listed below (Table 3).

In Addition to the cemeteries listed in Table 3, there is also a family plot off of EE, east of Wyatt with some standing stones (Anderson 1987c).

TABLE 3: Historic Cemeteries in Mississippi County

Twp.	Rng.	Sec.	1/4	Cemetery	Date*	Comments
27N	18E	33			1861	levee road N of Norfolk
27N	17E	2	SW, SE	Rush	1843	
27N	17E	11	NE, SE	Smith-Griggs	1867	
27N	17E	12	SE, NE	Allen	1839	original Rush cemetery
26N	17E	28	SW	McGee		O'Bryan Ridge cemetery
26N	17E	29	NW	Barnard	1875	Henson/Crockett cemetery
26N	17E	35	NE	O'Bryan's	1853	massive granite headstone
26N	17E	36		Corbett	1892	

* Earliest date (Mississippi Co. Geneological Society 1985)

SITE DISTRIBUTION ANALYSIS

PREDICTIVE MODELS

The study of site distributions within a defined area can be approached in various ways and various levels depending on the completeness of site information and environmental data. The ultimate goal is the definition of a regional settlement system which explains the relationship between sites, and between sites and the environment; and can be used as a basis for predicting the location of sites. The generation of such a model requires the development of an adequate archaeological data base including a representative sample of the various types of sites located within the area and specific knowledge about these sites such as precise chronological placement, site size and function, cultural affiliation, level of socio-political organization, ecological relationship to the surrounding environment, etc. This kind of data is not available for the study area. However some predictions can be made, based on available site distribution data, environmental features and an understanding of the relationship between human settlement and environment. Several studies have addressed the latter.

James Price (1974:40-51) attempted to do a settlement system study in the Ozark border region to the southwest of the study area. However, only larger Mississippian Period sites were used in his analysis. Price (1974: 68) concluded that such sites would be found on soils with a low risk for "aboriginal agricultural practices" (Tandarich and Reagan 1978:43).

There have been several other attempts at correlating site distribution and environmental factors. Ward (1965) and Larson (1970) used soils. Lewis (1973, 1974) and Cottier (1974, 1975) have used vegetation and soils. Tandarich and Reagan (1978) used soils, landforms, elevation and vegetation.

Ward (1965: 42-44) believed that soil characteristics such as particle size, fertility, periodic flooding, and soil management were important in determining the location of sites. He suggested that a fine sandy loam or silt loam soil was important in the location of 20 of 24 Mississippian sites surveyed and that site location was controlled by the dependence of Mississippian people on intensive maize cultivation within the limits of their technological capabilities.

Larson (1970) observed that most Mississippian sites are located on boundaries of natural areas allowing access to "two or more significantly contrasting ecological zones". Thus Mississippian sites were located on soil types suited for hoe cultivation but also at the juncture of at least two potentially rich ecological zones.

Cottier (1975) suggests that site location should be studied in relationship to natural factors such as elevation and landform, soil associations, and ecotones and biotic communities.

McNerney (1979) suggests that distance to water was an important consideration in site location. Most known archaeological sites are located near water according to McNerney (1979:12) because the need for a regular supply of water favored stream side locations; streams and rivers served as arteries of transportation; and lands near streams and rivers are well suited to modern agriculture and were cleared early in the Historic period. Although sites are more likely to be discovered in historic agricultural fields thus biasing the archaeological evidence for site locations McNerney (1979:12) maintains that statistical techniques including random sampling strategies show that distance from water is highly correlated with site location.

PREHISTORIC SETTLEMENT PATTERNS

Tandarich and Reagan (1978) concluded that a settlement system approach could not be used in the floodway because the necessary chronological data was not available. Instead they formulated a regional site distribution model based on known site locations, gross chronological placement and environmental data for a portion of Mississippi County.

According to Tandarich and Reagan (1978: Appendix 2), the selection of site location by aboriginal peoples was controlled by the complex relationship between social and environmental factors which was probably different for each period of occupation. They relied heavily on environmental data since the available site data in the region is limited to general cultural affiliation, site type, and site location. The site data available from the Missouri Archaeological Survey at the time included 3 Archaic period sites, 40 Baytown sites, 25 Mississippian sites, 2 historic, and 47 of unknown cultural affiliation (Each component/occupation at a particular locality was considered as a separate site in their analysis).

Although the small site sample was a limiting factor in developing a model for Archaic settlement, Tandarich and Reagan (1978) note that all Archaic sites were located on a single depositional unit, the braided stream terrace which is the oldest land form in the floodway. They concluded that it was possible that Archaic sites might be expected only on this landform since more recent, post-6,000 year-old surfaces were not stabilized during the Archaic period. The balance of known prehistoric sites were either Woodland (Baytown) or Mississippian. Both of these cultural periods represented a more stable sedentary pattern of settlement based on an agricultural economy.

"Common sense evaluation of land use patterns of the aboriginal indicates certain areas would have been preferred for site location. For example, flooded areas, seasonal swamps, and other similar areas would be avoided for long term/permanent occupations although short term or seasonal activities probably occurred in all areas where there were resources important to the adaptive scheme of the group under study", (Tandarich and Reagan 1978: Appendix 2, pp.4-5).

Tandarich and Reagan (1978: 51) determined that, "...one would expect the highest probability of archaeological site occurrence to be largely on soils exhibiting the following selected attributes: an elevation of 295 feet or above, moderately well and well drained, never or rarely flooded, high natural fertility and moderate permeability". However, they caution that soils that do not exhibit these attributes should not be ignored since they may have been occupied for special, intermittent use by aboriginal peoples.

According to McNerney (1979:4) prehistoric populations occupying the Mississippi floodplain were relatively sparse and felt no pressure to utilize zones which were high risk in terms of flooding. Early inhabitants of the alluvial valley opted for higher elevations on which to locate such as natural levees and remnant uplands of the valley floor (Lewis 1974:29, Williams 1956). These areas also offered a richer variety of vegetation than those found in lowlands (Phillips et al 1951:28) and soils along these higher elevations are "Lighter, more workable" (Berwick 1978:7) than other local soils which would have been important to farming populations. "In sum, then, elevated portions of the floodplain were highly favored for the protection they afforded from inundation, for the richer stands of vegetation they supported, and for the fertile, more easily worked soils of which they were composed " (Nixon 1982: 42-43).

According to Nixon (1982:43) prehistoric residents probably did not make use of bottom and swamp-forest environments except for occasional seasonal hunting/gathering activities. However, it might be better to say that such areas were not chosen as the sites of permanent settlements and that seasonal flooding may have prevented utilization during certain portions of the year. Nonetheless prehistoric populations probably made extensive use of the resources in such areas as one might expect temporary camps or special purpose activity areas along the periphery or located on slightly higher elevations within ordinarily swampy/poorly drained areas. The locations and distribution of such sites are important to an understanding of the total settlement and subsistence patterns of aboriginal populations in the project area. Several studies have recognized the need to learn more about small special purpose sites.

Price (1978:229-230) has pointed out the need for research at small sites if the Powers phase:

"There may be hundreds of small limited activity sites....Several of these sites should be excavated.... to understand better their spatial and seasonal relationship to the hamlet and village sites."

Smith (1978:499) also recognized this problem:

"A second obvious problem area in the analysis of Mississippian settlement systems exists in our almost total lack of knowledge of the "lower end" of such systems. with

a few notable exceptions, most research efforts have tended to focus on village sized Mississippian sites, with smaller than village sized sites being known only through surface survey."

Harn (1978:254-262) continues in this vein:

"Information regarding subsidiary sites is meager indeed...Only through qualification and quantification of the various factors involving the simplest life patterns at the smallest sites can we expect to unravel the complex organization expressed in settlement patterns."

Why do we know so little about small special purpose sites such as extractive camps? Could it be because we are expecting them to conform to the same patterns of site selection utilized by relatively permanent agricultural towns and villages. Survey within the study area which has been not been biased by the preconceived ideas about where one should look for sites but predicated on the needs of modern flood control suggests that we may be as likely to encounter sites in former back swamp areas as on natural levees and ridges.

HISTORIC SETTLEMENT PATTERNS

Discussions of historic settlement patterns in the region have been largely confined to Cultural Resource Management reports. A different set of opportunities and problems arise in analyzing historic settlement. The presence of historic records describing settlement of a region provides the opportunity to compare historic and archaeological evidence. On the other hand, it gives rise to the notion that the archaeological record has little additional to offer to our knowledge of historic occupation. A related problem is the seeming reluctance to attribute significance to historic sites and architectural features.

Nixon (1982:43-44) defined two historic settlement phases in southeast Missouri. The first covers the period from the earliest Euro-american settlement to ca. 1850 during which much of the floodplain remained inundated and swampy for extended periods of time. During this phase lowlying areas were inaccessible during much of the year and travel was difficult preventing the settlement of more distant if higher elevations within the region (Berwick 1978:6). Thus early historic populations faced the same settlement constraints as their prehistoric antecedents.

This coincides with the Frontier period from ca. 1800 to 1850 described by McNerney (1979:5). During this period, historic settlements depended primarily on agriculture. Prior to this hunting and trapping was the primary source of livelihood. McNerney (1979:5) notes that 1881 navigational charts show that occasional solitary farmsteads were located along the natural levees near the banks of the river. These sites occupy higher elevations and are associated with soils characteristic of such

elevations. According to Kniffen (1971:50) settlements consisted on isolated family groups located on these higher elevations.

Much of southeast Missouri was permanently swampy and would have provided no areas suitable for habitation. In addition these swampy areas provided effective barriers to travel throughout most of the year. Large areas of the Cairo Lowland which were not permanently wet were at least subject to seasonal flooding. Archaeological and historic evidence suggests that settlement patterns prior to drainage involved selection of low risk areas at higher elevations that would normally be dry during periods of seasonal flooding. These low risk areas would include natural levees, abandoned alluvial fans, and upland remnants (Berwick 1978:6).

According to Lewis (1974:32) the Euro-american settlement pattern was one of individual homesites "...selected from areas infrequently inundated, relatively close to tillable soils, having good drainage, and near a readily accessible supply of water." Kniffen (1971:50) describes Euro-american settlement as one of "...individuals or families living in almost complete isolation..." due to an economic adaptation based on subsistence agriculture, hunting and fishing, trapping, trading and limited exploitation of timber.

Beginning in the 1850s (the beginning of Nixon's Late Historic phase), ditching and levee construction changed the settlement options. Large tracts of swampland were drained and flooding came increasingly under control allowing the occupation of selected lower elevations (Nixon 1982:44). However, in the late 1800s and early 1900s settlement patterns in the floodplain were still much different than they are today. Mobility was limited as the main means of overland transportation was by horse and foot. Farm laborers lived on the land they worked and worker's homes dotted the fields, located on natural levees and/or on pilings as a precaution against flooding (Nixon 1982:227-228).

Development of the railroads, a lumbering industry, flood control projects and commercial agriculture eventually changed the settlement and economic patterns of the region (by the 1940s and 1950s). With modern mechanization, fewer hands could do more and more work and today's consolidated farms are operated by non-resident owners and a limited number of farm workers who live in nearby towns. This shift in the demand for farm labor has resulted in the abandonment of the homesites previously occupied by farm workers/tenant farmers. Approximately 80-90% of these have been destroyed and all that remains are scatters of historic living debris on the ground surface (Nixon 1982:227-228).

Nixon (1982) identified 25 such historic sites along the New Madrid Floodway including 23MI592 and 23MI594 located just to the west of the study area. These for the most part represent habitations dating in the 1830--1920 range which were identified on the basis of surface scatters of historic debris in agricultural fields. The presence of brick fragments, and domestic items

suggest most of these were former homesites and occasional finds of horseshoes or harness fragments suggest the presence of outbuildings associated with the maintenance of a farmstead. Generally these homesites are isolated but occasionally they cluster to form small communities around local agricultural centers.

Site 23MI592 seems to represent one such community where a long relatively dense scatter of historic materials was located suggesting the presence of barns, homes, outbuildings which may have been arranged along a "street" associated with the Rafferty Alfalfa Mill and the railroad. The local church was still standing (Nixon 1982:227-229). All 25 of these sites were dismissed as not archaeologically significant because they have been destroyed (in some cases incinerated); or they were considered to be locally numerous and to represent a period of recorded history for which there are documentary sources and therefore did not constitute unique cultural resources (Nixon et al 1982:229). From the standpoint of the current investigation of the study area, given the potential destruction of such resources should the floodway be put in operation, such conclusions must be reconsidered. Cynthia Price's work in the Ozark Border region has adequately demonstrated the value of such sites for contributing to our understanding of the lifeways of rural populations in southeast Missouri (e.g. Price, Girard and Harris 1978:58-65; C. Price and J. Price 1978; J. Price and C. Price 1976).

Nixon (1982:44) expected that historic, as well as prehistoric, sites would be located at higher elevations with only marginal usage of lower areas although more recent historical materials would be expected at any elevation within levee protected areas. This assumption does not take into account the changes in topography which have taken place within the span of man's occupation of the region or the full range of subsistence activities practiced by various populations and during different cultural phases. Furthermore time in which to test the validity of such assumptions is running out. Modification of the natural topography through land leveling, ditching, borrowing, levee and road construction and the consequent action of the river is making it increasingly difficult to identify prehistoric and historic settlement patterns and relate these to the natural environment.

McNerney and Fischer (1978:5) in their survey of the Wyatt Berm area noted that the contours along the river shown on the 1881 navigation charts no longer exist on recent topographic maps. They inferred from this that river action, land leveling and levee construction has altered the land surface since 1881.

Part of this development of agricultural land has involved land grading/leveling. Irregular topography is a deterrent to the economical use of large farm machines and mobile irrigation systems so in many parts of the study area have been graded smooth. Tandarich and Reagan (1978:37) reported that considerable land grading had taken place within Mississippi county during the period from 1963-1977 (Figure 13). The practice has continued since then and is on the increase. As of 1985, 41,924 acres in

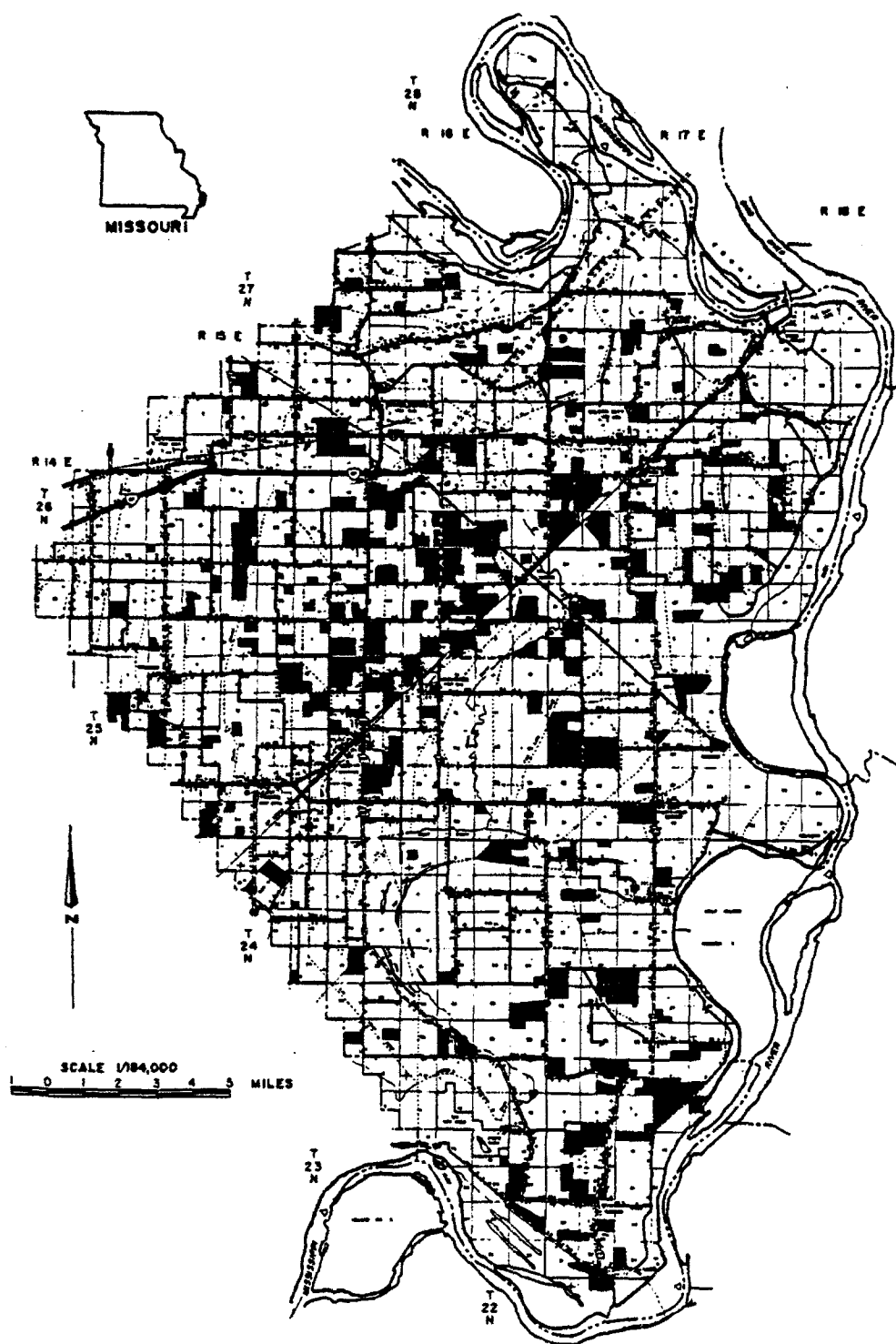


Figure 13. Land graded areas within Mississippi County, Missouri 1963-1977. (Reinbott 1977)

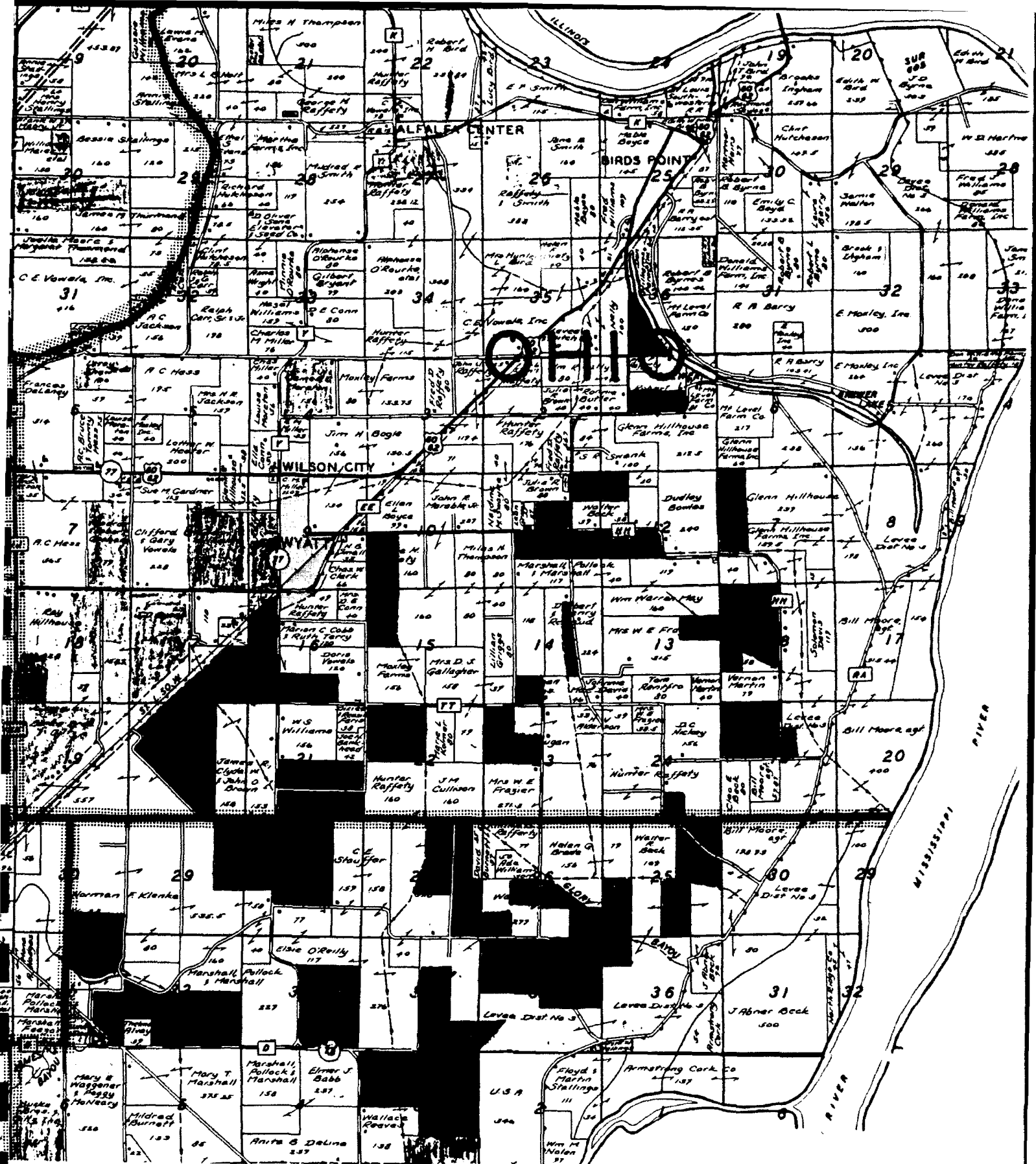


Figure 14. Land graded portions of the Study Area through 1985.

Mississippi County had been land graded (Soil Conservation Service n.d.). This has serious consequences in terms of the future of archaeological resources within the study area (Figure 14) and the region as a whole. As Tandarich and Reagan (1978:36) note: "Land grading represents the final step in the total alteration of the past landscape which as a consequence means the destruction of cultural remains associated with the past landscape".

ENVIRONMENTAL FACTORS AND SITE DISTRIBUTION

Elevation

McNerney (1979:4), Nixon (1982: 43), Larson (1970), Tandarich and Reagan (1978) all see elevation as an important consideration in prehistoric site selection. They generally adhere to the "Farmer's Hypothesis", that is, that common sense dictates that the highest probability of locating aboriginal settlements is on high, well drained soil: flooded areas and seasonal swamps would not be suitable for human occupation. Historic Euro-american occupation prior to the construction of levees and drainage systems would be expected to follow the same pattern (Nixon 1982: 43).

Tandarich and Reagan (1978:51) found that the highest probability of archaeological site occurrence in the Floodway was at elevations of 295 feet or more and McNerney (1979) noted that in a study of the St. John's Bayou-New Madrid Floodway area that 76% of recorded archaeological sites were on elevations of 290-310 feet. However, Nixon (1982:43) allows that bottom and swamp-land environments may have been utilized for seasonal hunting/gathering activities and Tandarich and Reagan (1978:51) caution that these areas should not be ignored since they may have been intermittently occupied for special purposes. They found that approximately 26.5% of the sites in the Floodway were located on ASC 1 & 2 soils which are generally lowlying and subject to flooding (Tandarich and Reagan 1978: Appendix 2).

Of the 35 archaeological sites located within the current study area, 11.4% (4) are at 305 feet, 60% (21) are at 310 feet, and 28.6% (10) are at 315 feet above sea level (Table 4). There does not seem to be any observable difference in the location of prehistoric and historic components in terms of elevation except that historic sites may be slightly more likely to occur on the highest elevations.

The value of elevation in predicting the likelihood of encountering archaeological sites and selecting a survey sample in the study area is limited however. Virtually all of this area is 305 feet above sea level or more and much former swampland is at 310 feet. A cursory examination of topographic maps shows that as much as 90% of the area may be above 310 feet. Although we would expect to find almost 90% of the archaeological sites in the study area at 310 feet or higher, based on the distribution of known sites, this distribution may not be representative since site discovery has been linked to historic land-use patterns.

Furthermore, elimination of areas below 310 feet from consideration would do little to reduce the sampling universe and it would preclude discovering 10% or more (we do not know how much more) of the sites which might be expected to occur in such areas.

Table 4: Distribution of Archaeological Sites relative to Elevation.

Elev.*	Prehistoric				Historic	Unident.	Total
	A	W	M	U			
305'				1	1	2	4 (09.5%)
310'	3	5	1	6	8	4	27 (64.3%)
315'		2	1		4	4	11 (26.2%)
Total	3	7	2	7	13	10	42 (100%)

Key: A = Archaic, W = Woodland/Baytown, M = Mississippian,
U = Unidentified Prehistoric

* Elevation given is highest elevation of site.

Soils

The distribution of archaeological sites relative to soils has received considerable attention and is related to elevation. Price (1974:68) noted that Mississippian sites would be found on soils with a low risk for "aboriginal agricultural practices". Likewise, Ward (1965:42-44) suggests that fine sandy loam or silt loam soil was important in the location of Mississippian sites. According to Berwick (1978:7) lighter more workable soils are commonly found at higher elevations.

Tandarich and Reagan's (1978) study of soil attributes revealed that archaeological sites were most likely to occur on soils that are moderately well to well drained, never or rarely flooded, with high natural fertility and moderate permeability. They found that 72% of the sites/components within the floodway occurred on such soils which comprise their Archaeological Soil Class 4. However over 27% of the site locations in the area occurred on soils that lacked these attributes and sites were not located on all soils in the preferred class. In fact 55 out of 81 (68%) sites/components associated with ASC 4 were located on only two soils, Tiptonville silt loam and Towosaghy loam. If these two soils were eliminated from the class, ASC 4 would have only a slightly higher probability of site occurrence than ASC 1 or ASC 2.

An examination of the distribution of sites and soils in the current study area gives quite a different picture. Forty two archaeological components were located on only 11 soil types (Table 5). Of these 10 (23.8%) were associated with ASC 2, 15 (35.7%) with ASC 4, and 16 (38.1%) with ASC 1 (and 1 with an artificial levee). In other words an equal number of sites were located on lowlying clay/clay loam soils as and on higher elevation silt/sandy loam soils. In fact the majority of sites occurred on ASC 1 and ASC 2 soils associated with poor drainage and frequent flooding.

Table 5: Distribution of Archaeological Sites relative to Soils

	Prehistoric				Historic	Unident.	Total
	A	W	M	U			
Soils							
ASC 1							
41A					1	1	2
42					6	2	8
ASC 2							
58/59					2	1	3
65					1	1	2
33	2	3	1	1	1		8
37A		1		1		1	3
ASC 4							
46				1		2	3
47	1	1		1			3
54				2		1	3
63		2	1	1	1	1	6
Orthents							
67					1		1
Total	3	7	2	7	13	10	42

A more detailed look at the data, however, reveals some patterns in the relationship between soil and site distributions. No identified prehistoric sites were located on ASC 2 soils, while only 1 historic site was located on soils of ASC 4. Both prehistoric and historic sites were located on ASC 1 soils but all of the known prehistoric sites associated with ASC 1 were located on two soils: Alligator silty clay and Bowdre silty clay loam. Bowdre soil accounted for the largest number of site locations (8) in the study area. Only 1 historic site was located on Alligator/Bowdre soils.

Apparently there is a difference in the distribution of prehistoric and historic sites that is related to soil type. Approximately 77% of the historic site locations were on Caruthersville or Commerce soils (ASC 2) or Sharkey soils (ASC 1) with the most common occurrence (6 out of 13 site locations) on Commerce soils. All of the known prehistoric sites were located on Alligator or Bowdre soils (ASC 1) and Dubbs, Dundee, Reelfoot or Tiptonville soils (ASC 4).

The distribution of historic sites is more limited than expected. Historic sites that are levee protected might occur on any elevation, soil type or landform but several of these sites pre-date the 1920s when effective flood control became a reality. The lack of historic sites on other, better drained soils, however is not expected since early Euro-american settlement patterns were similar to those of those of the prehistoric inhabitants of the area. Historic sources also indicated that early settlements tended to be dispersed along old levees and ridges characterized by ASC 4 soils. The only conclusion that can be made is that there is a great deal of bias in this data. Historic sites are not regularly reported except during the course of cultural resource management surveys and these have been concentrated in lower elevations where ASC 1 and ASC 2 soils are prevalent. This could also explain why a greater proportion of the prehistoric sites have not been found on ASC 4 soils as would be expected based on Tandarich and Reagan's (1978) findings.

The presence of such a high percentage (47%) of prehistoric sites on Alligator/Bowdre soils is totally unexpected. Although it has been suggested above that such soils would be utilized for temporary resource procurement activities and sites should thus be expected a portion of this high frequency must be due to sampling error. Never-the-less this data is valuable in that it indicates that certain soils in ASC 1 were being selected by aboriginal people as habitation sites. How do these soils differ from others in ASC 1?

Of the 7 soil types in ASC 1 that are found within the study area only Alligator and Bowdre soils are characteristically found on natural levees. Alligator and Bowdre soils are located in low terraces in broad level areas. Bowdre silty clay loam is a minor soil of the Tiptonville-Reelfoot association found on old natural levees, ridgetops or terraces at elevations similar to Tiptonville soils. Alligator soils are on slightly higher old terraces, low

ridges and depressions on floodplains (Tandarich and Reagan 1978: 11-12, Festervand 1981:13, 32). Thus these soils share one important characteristic with the ASC 4 soils; They are associated with terraces, ridgetops and levee formations which are usually contiguous with landforms associated with ASC 4 soils.

Landforms

A discussion of elevation and soils must include a consideration of landforms. The higher elevations supposedly favored as site locations are the terraces, ridges and levees that rise as little as 5-10 feet above the floodplain. According to Lewis (1974:29), aboriginal peoples selected higher elevations such as natural levees and remnant uplands of the valley floor. Tandarich and Reagan (1978: Appendix 2) noted that all Archaic sites in their study area were located on O'Bryan Ridge, a braided stream terrace and the oldest landform in the New Madrid Floodway and of course they found that the majority of other sites were on ASC 4 soils associated with terraces, ridge tops and natural levees.

One advantage in the consideration of land forms in predicting site locations is that geomorphological studies have given us some idea of the sequence of their development and their relative age (Fisk 1954; Saucier 1964, 1971, 1975). According to Saucier (1971) O'Bryan Ridge is a Braided Stream Terrace 2 dating to ca. 12,000-9,000 BP. Since the Mississippi-Ohio meander regimen probably did not begin in this region until ca. 6,000 BP and remained in a state of flux for long after this, O'Bryan Ridge may be the only surface formation in the study area that could be expected to contain sites dating to the Archaic period or earlier. It is possible according to Tandarich and Reagan (1978) that we would expect to find Archaic sites only on this land form since more recent post-6000 year-old land surfaces were not stabilized during this period of human occupation.

Likewise the current meander belt would not be expected to produce prehistoric sites since the soils and landforms in this area are too recent. The portion of the study area located to the north of O'Bryan Ridge is composed of landforms created by the meandering of the Mississippi River over the last 2000-6000 years. These include levees, point bars, abandoned river channels, backslopes and swamps. Thus the land surface is composed of sandy/silt loam ridges, sandy/silt clay backslopes, back swamps with clay soils and silty clay loam channel scars. These overlap to form a low relief but complex topography. Fisk (1944) mapped the various channels of the Mississippi and numbered them in chronological sequence so we have some idea of the relative age of related landforms in the study area (Figure 4).

The study area can be divided into the following landforms.

Old Levees formed on the banks of earlier river channels: These may date to as early as 2000 BP according to Fisk (1944) or 6000 BP according to Saucier (1974). However Fisk's maps indicate that those to the south and west of

Brewer's Lake are substantially older than those to the north and east. According to Fisk's scheme the meander belt in this area dates to ca. 2000-1500 BP. The portion of the meander belt which lies to the north and east of Brewer's Lake is more recent and contains both old and recent levees. In the study area, old levees are associated with Alligator clay, Bowdre silty clay loam, Dubbs silt loam, Dundee silt loam and Tiptonville silt loam.

Recent Levees formed on the banks of recent river channels: These may date from as early as 1000 BP up to the 20th century when levee construction interrupted the natural meandering pattern of the river. Recent levees are associated with Caruthers very fine sandy loam.

Abandoned Channels representing previous courses of the Mississippi River: These range from open sloughs and lakes to low, level areas filled with fine grained deposits of interbedded sands, clays or silts forming clay plugs. Abandoned channels are associated with Sharkey clay, Roellen silty clay, Tunica silty clay loam and very small deposits of Steel fine sand.

Braided Stream Terrace 2 formed during the braided stream regime the Mississippi followed prior to the onset of its meandering regime: This is represented by O'Bryan Ridge at the southern boundary of the study area and is the oldest land form in the Floodway. The braided stream terrace is associated with Bosket fine silty loam, Dubbs silt loam and Reelfoot silt loam.

Back Swamps which lie beyond the levees of river channels: These are low, poorly drained formations where lighter alluvial sediments are deposited. Behind the levee where water stands, lenses of clays and silts laminate in broad dense back swamp areas. Williams (1954:7) suggested that as much of 80% of the alluvial valley was made of of such areas prehistorically. Back swamp areas are associated with Sharkey clay.

Backslopes which fall perpendicularly away from natural levees: These are created when medium heavy sediments are deposited behind the levee to form gentle slopes (0-2%). Although these are frequently flooded they will eventually drain (Nixon et al 1982:19). In the study area backslopes appear to be associated with Commerce silt loam deposits behind recent levees. In the older portions of the meander belt it is difficult to distinguish backslopes from eroded/deflated levees. These may be represented by Alligator clay and Bowdre silty clay loam.

All of the prehistoric archaeological sites within or adjacent to the study area are located on either the braided stream terrace or on old natural levees. Four of the unidentified sites, but only 2 historic sites are located on these formations. The majority (7

out of 12) of historic sites are located on relatively recent alluvial deposits: recent levees and backslopes (Table 6).

Table 6: Distribution of Archaeological Sites relative to Landforms.

Landforms	Prehistoric				Historic	Unident.	Total
	A	W	M	U			
Br. Terrace	1	2	1	1		1	6
Old Levee	2	6	2	6	2	3	21
Recent Levee					1	1	2
Backslope					6	2	8
Aban. Channel					2	2	4
Setback Levee					1		1
Total	3	8	3	7	12	9	42

The distribution of archaeological sites is what would be expected. Approximately half of the prehistoric site locations were on soils that are somewhat poorly or poorly drained, however they are associated with old natural levees and terraces. These are generally at the lower edges of larger levees and project finger-like into back swamp areas and between abandoned river channels. At present they do not appear to offer much advantage in protection from flooding. They may represent backslope areas that drained slowly but did provide access to wetland resources during certain seasons. On the other hand they may have once been relatively high elevations now diminished by erosion or the accretion of adjacent levees during the long history of the meander belt.

As with soils, distribution of historic sites relative to landforms was only partially expected. Historic sites would be expected to occur on more recent deposits which may not have been stabilized during prehistoric times and on lower landforms. However a substantial number of sites should be expected to occur on higher landforms. We know from the historic record that early Euro-american settlements were located along natural levees and terraces such as O'Bryan Ridge and Rush Ridge. Again, it must be concluded that the distribution of historic sites is probably biased as result of sampling error.

Biotic Communities

Prehistoric and early Historic populations (Kniffen 1971:50) depended heavily on the natural floral and faunal resources in their environment. Thus the distribution of such resources would have been important in site selection. Phillips et al 1951:28 suggested that higher elevations such as natural levees offered a richer variety of vegetation. Larson (1970) observed that Mississippian sites were generally located on the boundaries of natural areas providing access to two or more ecozones.

Lewis (1973, 1974) has described a model of biotic communities which can be used to make inferences concerning the distribution of resources within the study area. The floodplain by nature is composed of a variety of landforms supporting a number of different kinds of biotic communities ranging from Natural Levee Forests to Cypress Swamps. All of these ecozones would be easily accessible within a day's journey of any location within the study area. In other words the primary catchment area for almost any site would include the full range of available biotic resources.

Within such a rich and varied ecosystem it is expected that habitation sites would be located on the higher locations (levees and terraces) above, river channels, seasonal swamps and wetlands. Special purpose camps and activity areas would be expected in some less well-drained areas such as the edges of levees and back-slopes. Aboriginal hunters and gatherers would be expected to keep to easily traversed (high, dry) trails along ridgetops and terraces as much as possible and would have no need to do anything more than the performance of actual procurement activities in swampy/wetland environments. Therefore it is expected that few if any sites would be encountered within abandoned channels or back swamp formations.

Early historic settlement would be expected to follow a similar pattern. However the selection of settlement locations by historic populations who were not dependent on natural floral and faunal resources would be based on other economic considerations such as access to trade/transportation routes.

Water

Access to water has always been important in the selection of sites of human occupation. According to McNerney (1979:12), aboriginal populations favored stream-side locations because of their need for a regular supply of water. In addition streams and rivers are important arteries of transportation, and a source of aquatic resources. Lewis (1974:32) also lists a readily available source of water as one of the criteria for homesite selection among Euro-american settlers.

The value of nearness to water in predicting site locations may seem questionable in an area such as the Floodway where too much water has always been a problem. McNerney's (1979) finding that

52% of known sites were located within 1/4 mile of existing or previous water courses seems redundant given the geomorphology of this region. Virtually every location in the study area is within 1/4 mile of a former river channel. It appears that this information does not add much to our understanding of the prehistoric settlement pattern in the study area, but it has some value in predicting the distribution of historic sites.

Until the construction of railroads and paved roads the river was the major means of transporting goods and people in the study area. The first Euro-american settlement in the area was at Birds Point on the river and the historic record reports settlements and homesites extending along the river between Birds Point and Norfolk Landing between 1800 and 1920. Therefore historic sites would be expected to occur along any portion of the 19th century river shoreline which lies within the study area. Most or all of these early settlements have eroded into the river or have been buried by alluvium and it is likely that any prehistoric shoreline sites along the various river channels suffered a similar fate.

The Man-made Environment

It is obvious that the construction of ditches and levees have substantially altered the environment in the study area but effective drainage and flood control did not substantially alter settlement patterns until well into the 20th century. Prior to 1850 historic and prehistoric settlement faced the same environmental constraints but following 1850 man-made "improvements" began to open up new areas for settlement. Roads, even primitive plank and gravel roads facilitated the transportation of goods and people inland and allowed the growth of dispersed farming communities along O'Bryan Ridge and Rush Ridge and the establishment of scattered homesteads along the roads themselves.

After the Civil War, railroads improved communication and transportation, and encouraged commercial development of the region. Concerted efforts at flood control and land reclamation began in the decade before the turn of the last century. The construction of miles of ditches and levees resulted in the draining of seasonal and year-round wetlands, and deforestation. This created thousands of acres of new farmland and opening up the entire study area to settlement although periodic flooding remained a problem into the 1920s. Farm laborers lived on the land they worked and their homesites dotted the landscape, located on natural levees and/or pilings as a precaution against flooding (Nixon 1982:44). However, although most of the area was drained by 1920 it was not cleared. According to Ben Bird Moore (1987: p.c.) it was not until after World War II that most of the study area was cleared and put into agricultural production.

The growth of modern, mechanized agriculture after World War II resulted in the abandonment of rural homesites as a reduced farm labor force settled in villages and towns outside of the study area. According to Nixon (1982: 227-228) 80-90% of these home-

sites have been destroyed and the land they occupied brought under cultivation. Another result of farm mechanization has been the practice of land grading/leveling. Bill Barker (1987: p.c.) of the Soil Conservation Service estimates that at least 80% of the land in Mississippi County has been graded or altered in some way. Although this seems to be less extensive in the study area. Reinbott's (1977) map shows the areas which had been graded between 1963 and 1977 (Figure 13) and maps at the Soil Conservation Service Office in Charleston show the location of grading through 1983 (Figure 14).

Human manipulation of the environment has altered the relationship between the distribution of Euro-american settlements and environmental features over time. Sites of the early historic phase would be expected to occur along O'Bryan Ridge and Rush Ridge and along the river shoreline. During the late historic phase sites in these localities would be expected to be more numerous and scattered sites would be expected to occur on newly cleared and/or drained land, and along roads and rail lines.

Because human alteration of the environment through ditching, levee construction and land grading results in major disturbance of land surface, no intact archaeological sites, prehistoric or historic, would be expected to occur in areas where such activities have taken place.

CONCLUSIONS AND RECOMMENDATIONS

DEFINING THE SAMPLING UNIVERSE

In defining the sampling universe three kinds of information must be considered.

1. What kinds of sites would be expected and where are they most likely to occur within the study area?
2. What areas should be excluded because serious disturbance of the ground surface precludes the possibility of encountering reasonably intact sites that could be considered significant cultural resources?
3. What areas can be eliminated because they will be or have been previously surveyed?

It is concluded from the previous discussion that both prehistoric and early historic sites would be expected to be confined to ridgetops, terraces and old levee formations and the soils associated with these formations. An examination of United State Geological Survey (USGS) topographic maps and Soil Conservation Service (SCS) soil (aerial photo) maps shows that there is a good correspondence between these landforms and the Alligator, Bowdre, Dubbs, Dundee, Reelfoot and Tiptonville soil map units which can be used as a guide in selecting a survey sample. Early historic sites would also be expected to occur along the river shoreline.

In the Late Historic phase, sites would be expected to also occur along roads and rail lines, and would be possible anywhere on the landscape that cultivated fields occurred.

Areas on the SCS soil maps that are designated Orthents (artificial levees/water complexes); open sloughs and ditches; and land graded areas are considered to have close to 0% probability of producing archaeological sites. These will not be considered further.

Several Cultural Resource surveys have been conducted in the study area. A portion of the study area has already been designated for intensive archaeological survey and the O'Bryan Ridge Archaeological District listed on the National Register of Historic Places must be surveyed or mitigated. The boundaries of the areas surveyed are shown on Figure 15. These areas are excluded from further consideration.

RECOMMENDATIONS

Sampling Strategy

The portion of the study where there is a highest probability of archaeological site occurrence is shown in detail on Maps C1-5 (Appendix C). This sampling universe included approximately 6,500 acres of the original 17,500 study area. It includes ridgetops, terraces, and old levees identified on the basis of relative elevation and soil type (Figure 16). It does not include the river shoreline where historic sites are expected to occur on more recent landforms because all sections of the historic shoreline have already been surveyed, have been selected for intensive archaeological survey, or lie outside the limits of the study area. A straight random sampling procedure is suggested in the selection of the approximate 3,000 acre survey sample. This will provide close to 50% coverage of the identified area of highest probability for archaeological site occurrence.

A stratified sample is not suggested since the statistical data necessary for stratification of the sampling universe is lacking. No special provision in this strategy is made for late historic sites which might be located along transportation routes or more or less randomly scattered across the landscape. Although some of these may occur in landforms such as abandoned channels and former back swamps the expected number and quality of sites on these landforms does not merit sampling of these extremely low probability areas. In all likelihood simple random sampling will be as effective in encountering late historic sites as any other strategy.

Probably the simplest means of selecting the actual survey sample is to divide the identified sampling universe into quarter sections (160 acre units) or quarter quarter sections (40 acre units) using the detail maps provided (Appendix C) and simply choosing 19 quarter sections or 75 quarter quarter sections at

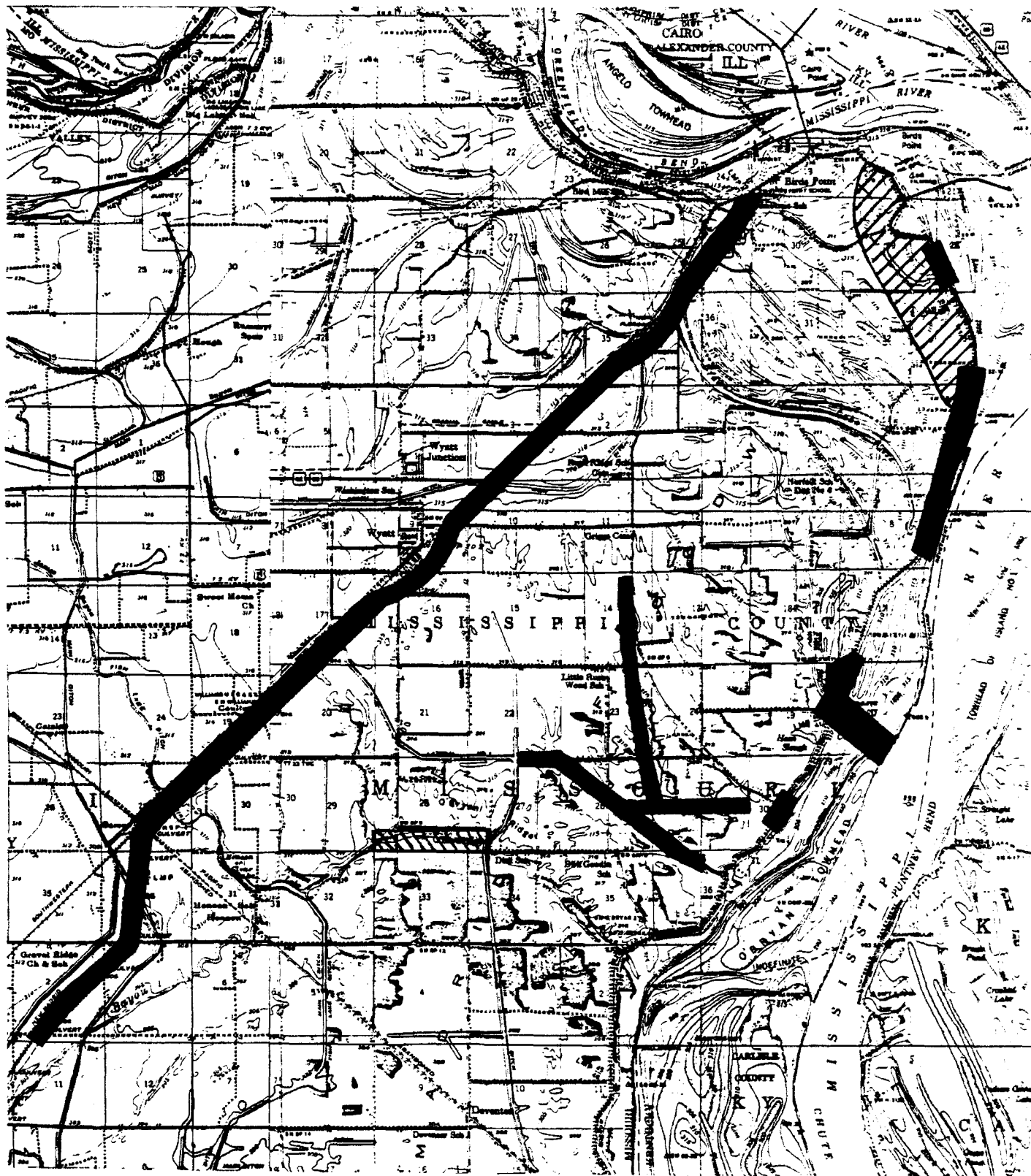


Figure 15. Location of Cultural Resource Surveys within the Study area.

- Survey limits
- Area excluded from proposed survey
- O'Bryan Ridge Archaeological District

random. Of course, a stratified sample may be chosen based on the estimated relative degree of impact expected on various portions of the sampling universe should the Floodway be put into operation.

Survey Strategy

In order to insure the highest probability of discovering archaeological sites within the survey sample, it is recommended that the survey be conducted during the late Fall through early Spring (late October-early May) when fields are not in crop and ground cover is minimal. Because the geography and geomorphology of the study area has been extremely dynamic throughout the periods of prehistoric and historic occupation there is a high probability of occurrence of buried landforms and associated buried archaeological sites within the study area. Therefore it is also recommended that some form of systematic subsurface testing be included in the survey strategy.

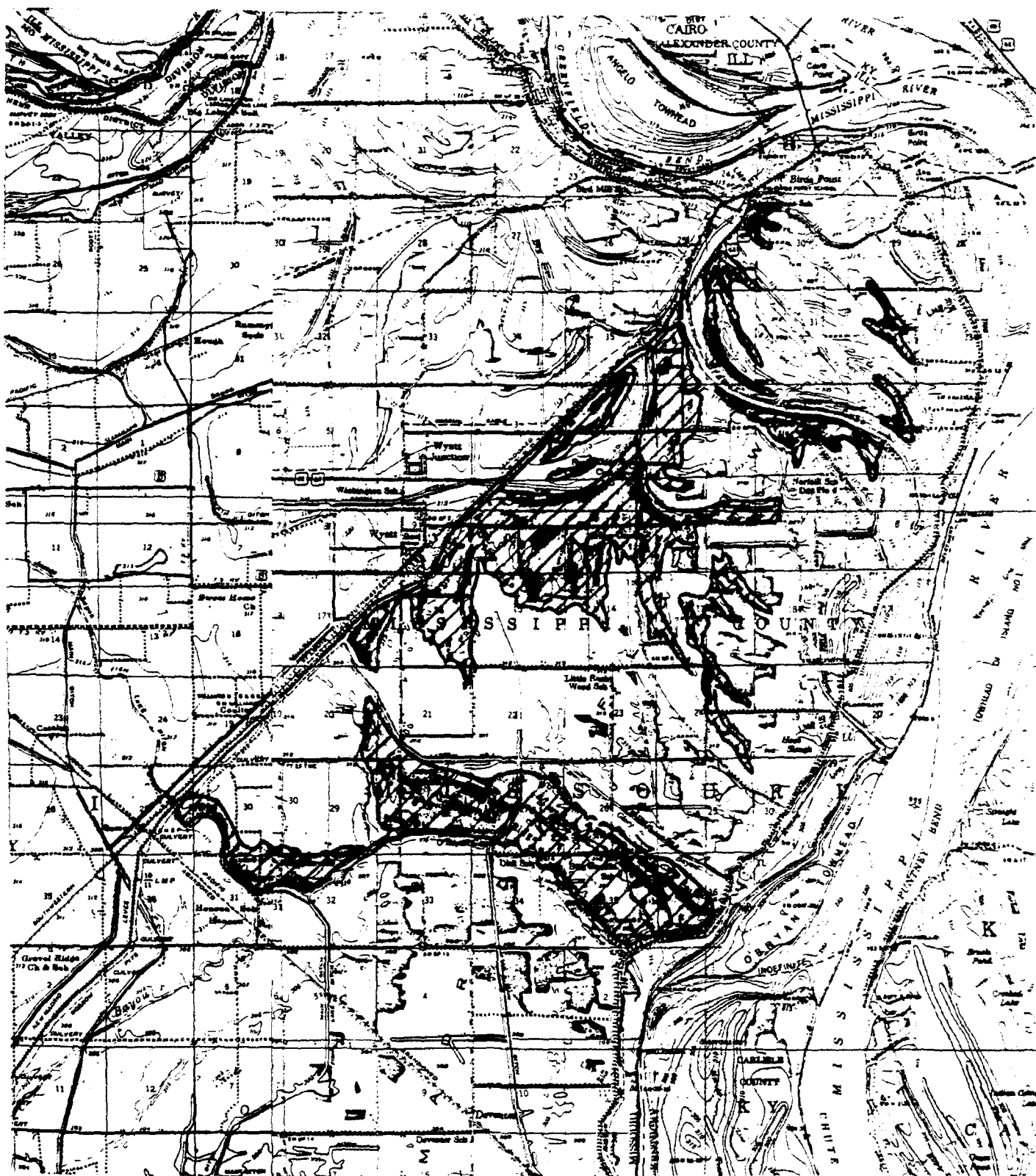


Figure 16. Approximate Location of Areas of Highest Probability of Archaeological Site Occurrence within the Study Area.



Highest Probability Areas

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APPENDIX A

SCOPE OF WORK

SCOPE OF WORK

Cultural Resource Predictive Modeling for an Intensive Survey of Portion of the Birds Points-New Madrid Floodway, Mississippi County, Missouri.

1. GENERAL.

1.1. The Contractor shall develop a predictive model for the intensive survey of portions of the Birds Point-New Madrid Floodway, Mississippi County, Missouri. These tasks are in partial fulfillment of the Memphis District's obligations under the National Historic Preservation Act of 1966 (P.L. 89-665); the National Environment Policy Act of 1969 (P.L. 91-190); Executive Order 11593, "Protection and Enhancement of Cultural Environment," 13 May 1971 (36 F.R. 3921); Preservation of Historic and Archaeological Data, 1974 (P.L. 93-291); and the Advisory Council on Historic Preservation, "Procedures for the Protection of Historic and Cultural Properties" (36 CFR VIII Part 800).

1.2. Personnel Standards.

a. The Contractor shall utilize a systematic, interdisciplinary approach to conducting the study. Specialized knowledge and skills will be used during the course of the study to include expertise in archaeology, history, architecture, geology and other disciplines as required. Techniques and methodologies used for the study shall be representative of the state of current professional knowledge and development.

b. The following minimal experiential and academic standards shall apply to personnel involved in cultural resources investigations described in this Scope of Work:

(1) Archeological Project Directors of Principal Investigators (PI). Persons in charge of an archeological project or research investigation contract, in addition to meeting the appropriate standards for archeologist, must have a publication record that demonstrates extensive experience in field project formulation, execution and technical monograph reporting. Suitable professional reference may also be made available to obtain estimates regarding the adequacy of prior work. If prior projects were of a sort not ordinarily resulting in a publishable report, a narrative should be included detailing the proposed project director's previous experience along with references suitable to obtain opinions regarding the adequacy of this earlier work.

(2) Archeologist. The minimum formal qualifications for individuals practicing archeology as a profession are a B.A. or B. Sc. degree from an accredited college or university, followed by 2 years of graduate study with concentration in anthropology and specialization in archeology and at least

two summer field schools or their equivalent under the supervision of archeologists of recognized competence. A Master's thesis or its equivalent in research and publication is highly recommended, as is the M.A. degree.

(3) Other Professional Personnel. All non-archeological personnel utilized for their special knowledge and expertise must have a B.A. or B.S. degree from an accredited college or university, followed by a minimum of one year of successful graduate study with concentration in appropriate study.

(4) Other Supervisory Personnel. Persons in any archeological supervisory position must hold a B.A., B.S. or M.A. degree with a concentration in archeology and a minimum of 2 years of field and laboratory experience.

(5) Crew Members and Lab Workers. All crew members and lab workers must have prior experience compatible with the tasks to be performed under this purchase order. An academic background in archeology/anthropology is highly recommended.

c. All operations shall be conducted under the supervision of qualified professionals in the discipline appropriate to the data that is to be discovered, described or analyzed. Vitae of personnel involved in project activities may be required by the Contracting Officer at anytime during the period of service of this purchase order.

1.3. The Contractor shall designate in writing the name of the Principal Investigator. In the event of controversy or court challenged the Principal Investigator shall testify with respect to report findings.

1.4. The Contractor shall keep standard records which may be reviewed by the Contracting Officer. These records shall include notes, any cultural resource forms and/or records, field maps and photographs necessary to successfully implement requirements of this Scope of Work.

1.5. Should it become necessary in the performance of the work and services of the Contractor to secure the right of ingress and egress to perform any of the work required herein on properties not owned or controlled by the Government, the Contractor shall secure the consent of the owner, his representative, or agent, prior to effecting entry on such property.

1.6. Innovative approaches to data location, collection, description and analysis, consistent with other provisions of this contract and the cultural resources requirements of the Government, are encouraged.

1.7. The Contractor shall furnish expert personnel to attend conferences and furnish testimony in any judicial proceedings involving the archaeological and historical study, evaluation, analysis and report. When required,

arrangements for these services and payment, therefore, will be made by representatives of either the U. S. Army Corps of Engineers or the Department of Justice.

1.8. The Contractor, prior to the acceptance of the final report, shall not release any sketch, photograph, report or other material of any nature obtained or prepared under this purchase order without specific written approval of the Contracting Officer.

1.9. The extent and character of the work to be accomplished by the Contractor shall be subject to the general supervision, direction, control and approval of the Contracting Officer. The Contracting Officer may have a representative of the Government present during any or all phases of the described cultural resource project.

2. STUDY AREA.

2.1. The study area is located in Mississippi County, Missouri. It is bounded on the west by the setback levee, on the east and north by the Main line levee, and on the south by the first 310 foot contour line extending from the setback levee east to the mainline levee. See attached map. The project is located on the Charleston, MO-ILL. and Wickliffe, KY-MO-ILL. 15 minute quadrangle maps.

Excluded from the project area is approximately 900 acres in the northern portion of the Floodway. This area extends from the beginning of levee mile 34 to the beginning levee mile 37 and extends landward from the levee approximately 1/2 mile for the entire length of this levee section. Note darkened area at top of the attached map. The acreage for this area is not included in the survey area. However the site/land form/soil type information for the area should be used in the study. The study contains approximately 17,500 acres.

3. DEFINITIONS.

3.1. "Cultural Resources" are defined to include any buildings, site, district, structure, object, data, or other material relating to the history, architecture, archeology, or culture of an area.

3.2. "Background and Literature Search" is defined as a comprehensive examination of existing literature and records for the purpose of inferring the potential presence and character of cultural resources in the study area. The examination may also serve as collateral information to field data in evaluating the eligibility of cultural resources for inclusion in the National Register of Historic Places or in ameliorating losses of significant data in such resources.

3.3. "Intensive Survey" is defined as a comprehensive, systematic, and detailed on-the-ground survey of an area, of sufficient intensity to determine the number, types, extent and distribution of cultural resources present and their relationship to project features.

3.4. "Mitigation" is defined as the amelioration of losses of significant prehistoric, historic, or architectural resources which will be accomplished through preplanned actions to avoid, preserve, protect, or minimize adverse effect upon such resources or to recover a representative sample of the data they contain by implementation of scientific research and other professional techniques and procedures. Mitigation of losses of cultural resources include, but is not limited to, such measures as: (1) recovery and preservation of an adequate sample of archeological data to allow for analysis and published interpretation of the cultural and environmental conditions prevailing at the time(s) the area was utilized by man; (2) recording, through architectural quality photographs and/or measured drawings of buildings, structures, districts, sites and objects and deposition of such documentation in the Library of Congress as a part of the National Architectural and Engineering Record; (3) relocation of buildings, structures and objects; (4) modification of plans or authorized projects to provide for preservation of resources in place; (5) reduction or elimination of impacts by engineering solutions to avoid mechanical effects of wave wash, scour, sedimentation and related processes and the effects of saturation.

3.5. "Reconnaissance" is defined as an on-the-ground examination of selected portions of the study area, and related analysis adequate to assess the general nature of resources in the overall study area and the probable impact on resources of alternate plans under consideration. Normally reconnaissance will involve the intensive examination of not more than 15 percent of the total proposed impact area.

3.6. "Significance" is attributable to those cultural resources of historical, architectural, or archeological value when such properties are included in or have been determined by the Secretary of the Interior to be eligible for inclusion in the National Register of Historic Places after evaluation against the criteria contained in How to Complete National Register Forms.

3.7. "Testing" is defined as the systematic removal of the scientific, prehistoric, historic, and/or archeological data that provide an archeological or architectural property with its research or data value. Testing may include controlled surface survey, shovel testing, profiling, and limited subsurface test excavations of the properties to be affected for purposes of research planning, the development of specific plans for research activities, preparation of notes and records, and other forms of physical removal of data and the material analysis of such data and material, preparation of reports on such data and material and dissemination of reports and other products of the research. Subsurface testing shall not proceed to the level of mitigation.

3.8. "Analysis" is the systematic examination of material data, environmental data, ethnographic data, written records, or other data which may be prerequisite to adequately evaluating those qualities of cultural loci which contribute to their significance.

4. GENERAL PERFORMANCE SPECIFICATIONS.

4.1. The Contractor shall prepare for the project area a draft and final report detailing the results of the study and subsequent recommendations.

4.2. Developing Predictive Statements.

a. This task shall include an examination of the historic and prehistoric environmental setting and cultural background of the study area and shall be of sufficient magnitude to achieve a detailed understanding of the overall cultural and environmental context of the study area. Known site locations will be studied in conjunction with existing land forms and soil types.

b. Information and data for the literature search shall be obtained, as appropriate, from the following sources: (1) Scholarly reports books, journals, theses, dissertations and unpublished papers; (2) Official Records- Federal, state, county and local levels, property deeds, public works and other regulatory department records and maps; (3) Libraries and Museums - both regional and local libraries, historical societies, universities, and museums; (4) Other repositories - such as private collections, papers, photographs, etc.; (5) Archeological site files at local universities, the State Historic Preservation Office, the State Archeologist; (6) Consultation with qualified professionals familiar with the cultural resources in the area, as well as consultation with professional in associated areas such as history, sedimentology, geomorphology, agronomy, and ethnology.

c. The Contractor shall include as an appendix to the draft and final reports written evidence of all consultation and any subsequent response(s), including the dates of such consultation and communications.

d. The background and literature search shall be performed in such a manner as to facilitate predictive statements (to be included in the study report) concerning the probable quantity, character, and distribution of cultural resources within the project area. In addition, information obtained in the background and literature search should be of such scope and detail as to serve as an adequate data base for subsequent field work and analysis in the study area undertaken for the purpose of discerning the character, distribution and significance of identified cultural resources. The basic intent of this study is to develop a predictive model that defines the 17% (Approximately 3,000 acres) of the study area that holds the highest potential for cultural resources. This shall define the area for pedestrian survey.

e. In order to accomplish the objectives described in paragraph 4.2.d., it will be necessary to attempt to establish a relationship between landforms and the patterns of their utilization by successive groups of human inhabitants. This task should involve defining and describing various zones of the study area with specific reference to such variables as past topography, potential food resources, soils, geology, and river channel history.

5. GENERAL REPORT REQUIREMENTS.

5.1. The primary purpose of the cultural resources report is to serve as a planning tool which aids the Government in meeting its obligations to preserve and protect our cultural heritage. The report will be in the form of a comprehensive, scholarly document that not only fulfills mandated legal requirements but also serves as a scientific reference for future cultural resources studies. As such, the report's content must be not only descriptive but also analytic in nature.

5.2. Upon completion of all research, the Contractor shall prepare a report detailing the work accomplished and the results.

5.3. The report shall include, but not necessarily be limited to, the following sections and items:

a. Title Page. The title page should provide the following information; the type of task undertaken, the cultural resources which were assessed (archeological, historical, architectural); the project name and location (county and state), the date of the report; the Contractor's name; the purchase order number; the name of the author(s) and/or the Principal Investigator; and the agency for which the report is being prepared.

b. Abstract. The abstract should include a summary of the number and types of resources which were surveyed, results of activities and the recommendations of the Principal Investigator.

c. Table of Contents.

d. Introduction. This section shall include the purpose of the report; a description of the proposed project; a map of the general area; a project map; and the dates during which the task was conducted. The introduction shall also contain the name of the institution where recovered materials will be curated.

e. Environmental Context. This section shall contain, but not be limited to, a discussion of probably past floral and faunal characteristics of the project area. Since data in this section may be used in the future evaluation of specific cultural resource significance, it is imperative that the quantity and quality of environmental data be sufficient to allow subsequent detailed analysis of the relationship between past cultural activities and environmental variables.

f. Previous Research. This section shall describe previous research which may be useful in deriving or interpreting relevant background research data, problem domains, or research questions and in providing a context in which to examine the probability of occurrence and significance of cultural resources in the study area.

g. Literature Search and Personal Interviews. This section shall discuss the results of the literature search, including specific data sources, and personal interviews which were conducted during the course of investigations.

h. Conclusions and Recommendations. This section shall contain the recommendations of the Principal Investigator regarding all contract activities. Conclusions derived from records search concerning the nature, quantity and distribution of cultural loci, should be used in describing the probable impact of project alternatives on cultural resources. Conclusions and recommendations should include an evaluation of predictive statements formulated on the basis of the background and literature search.

i. References (American Antiquity Style).

j. Appendices (maps, correspondence, etc.). A copy of this Scope of Work shall be included as an appendix in all reports.

5.4. The above items do not necessarily have to be discrete sections; however, they should be readily discernable to the reader. The detail of the above items may vary somewhat with the purpose and nature of the study.

5.5. In order to prevent potential damage to cultural resources, no information shall appear in the body of the report which would reveal precise resource location. All maps which indicate or imply precise site locations shall be included in reports as a readily removable appendix (ex:envelope).

5.6. No logo or other such organizational designation shall appear in any part of the report (including tables or figures) other than the title page.

5.7. Unless otherwise specifically authorized by the Contracting Officer, all reports shall utilize permanent site numbers assigned by the state in which the study occurs.

5.8. All appropriate information (including typologies and other classificatory units) not generated in these contract activities shall be suitably referenced.

5.9. Information shall be presented in textual, tabular, and graphic forms, whichever are most appropriate, effective and advantageous to communicate necessary information. All tables, figures and maps appearing in the report shall be of publishable quality.

5.10. Any abbreviated phrases used in the text shall be spelled out when the phrase first occurs in the text. For example, use "State Historic Preservation Officer (SHPO)" in the initial reference and thereafter "SHPO" may be used.

5.11. The first time the common name of a biological species is used it should be followed by the scientific name.

5.12. In addition to street addresses or property names, sites shall be located on the Universal Transverse Mercator (UTM) grid.

5.13. All measurements should be metric. If the Contractor's equipment is in the English system, then the metric equivalents should follow in parentheses.

5.14. As appropriate, diagnostic and/or unique artifacts, cultural resources of their contexts shall be shown by drawings or photographs.

5.15. Black and white photographs are preferred except when color changes are important for understanding the data being presented. No instant type photographs may be used.

5.16. Negatives of all black and white photographs and/or color slides of all plates included in the final report shall be submitted.

6. SUBMITTALS.

6.1. The Contractor shall, unless delayed due to causes beyond his fault or negligence, complete all work and services under the purchase order within the following time limitations after receipt of notice to proceed.

a. Four (4) copies of the draft report will be submitted within 75 calendar days following receipt of notice to proceed.

b. The Contractor shall submit under separate cover, four copies of appropriate 15' quadrangle maps (7.5' when available) and other site drawings which show proposed boundaries of all areas to be surveyed for cultural resources within the project area and their relationship to project features, and single copies of all forms, records and photographs described in paragraph 1.4. Known sites shall also be plotted on the maps.

c. The Government shall review the draft report and provide comments to the Contractor within 30 calendar days after receipt of the draft report.

d. An unbound original and 25 copies of the final report shall be submitted within 30 calendar days following the Contractor's receipt of the Government's comments on the draft report.

6.2. If the Government review exceeds 30 calendar days, the period of service of the purchase order shall be extended on a day-by-day basis equal to any additional time required by the Government for review.

a. All maps which indicate or imply actual site locations shall be included in reports as a readily removeable appendix (ex:envelope). In order to prevent potential damage to cultural resources, no information shall appear in the body of the report which would suggest resource location.

b. All final reports shall be in a professional quality binding. The binding will have the report title on the front.

6.3. At any time during the period of service of this purchase order, upon the written request of the Contracting Officer, the Contractor shall submit, within 30 calendar days, any portion or all field records described in paragraph 1.4 without additional cost to the Government.

7. SCHEDULE.

7.1. The Contractor shall, unless delayed due to causes beyond his control and without his fault or negligence, complete all work and services under this purchase order within the following time limitations.

<u>Activity</u>	<u>Completion Time</u> (In calendar days beginning with acknowledged date of receipt of notice to proceed)
Begin Research	10
Submittal of Draft Report of Investigation	75
Submittal of Final Report of Investigations	135

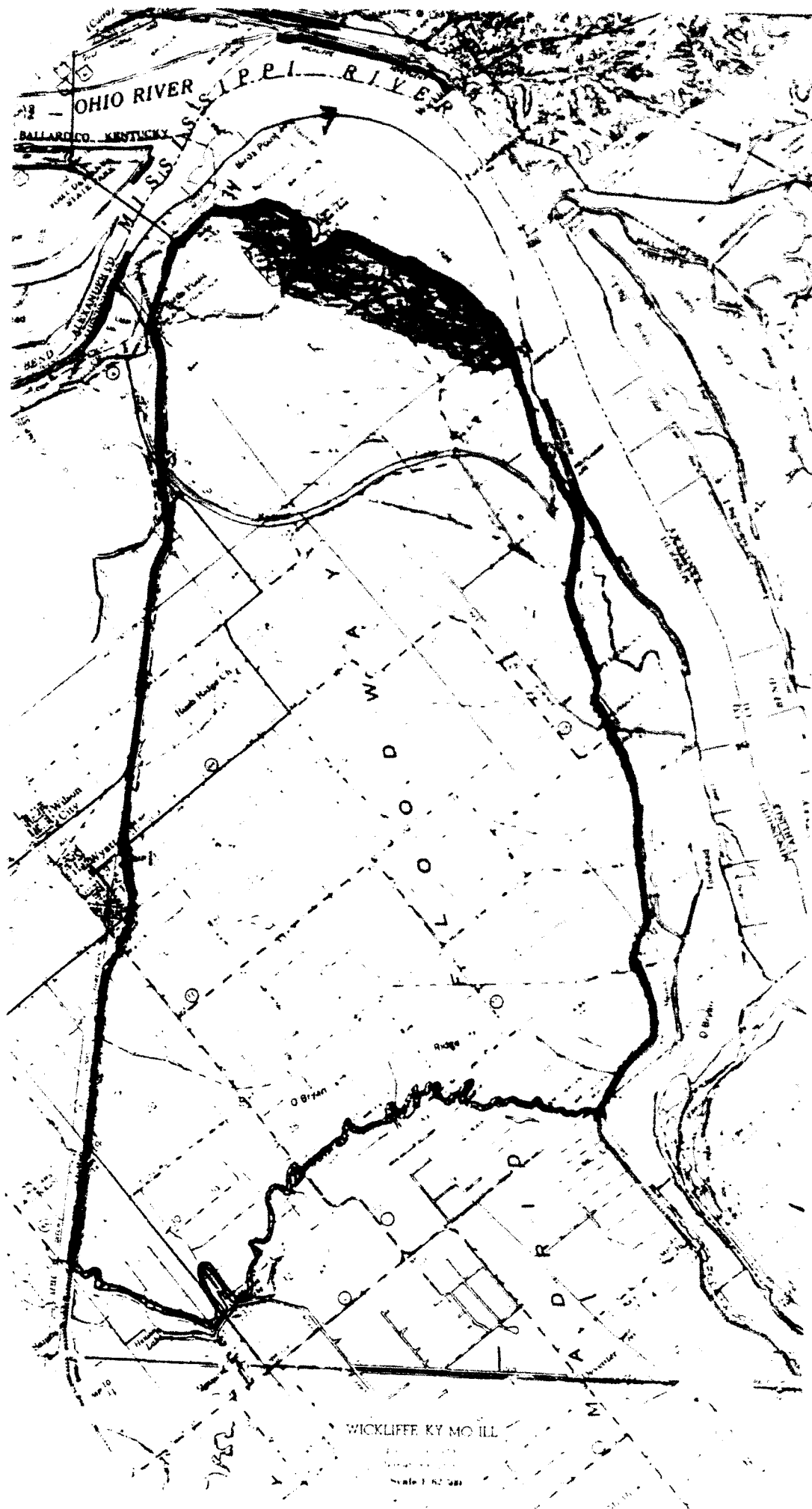
7.2. The Contractor shall make any required corrections after review by the Contracting Officer. The Contracting Officer may defer Government review comments pending receipt of review comments from the State Historic Preservation Officer or other reviewing agencies. More than one series of draft report corrections may be required. In the event that the government review period is exceeded and upon request of the Contractor, the purchase order time period will be extended automatically on a calendar day for day basis. Such extension shall be granted at no additional cost to the Government.

8. METHOD OF PAYMENT.

8.1. Upon satisfactory completion of work by the Contractor, in accordance with the provisions of this purchase order, and its acceptance by the Contracting Officer, the Contractor will be paid the amount of money indicated in Block 25 of the purchase order.

8.2. If the Contractor's Work is found to be unsatisfactory and if it is determined that fault or negligence on the part of the Contractor or his employees has caused the unsatisfactory condition, the Contractor will be liable for all costs in connection with correcting the unsatisfactory work. The work may be performed by Government forces or Contractor forces at the direction of the Contracting Officer. In any event, the Contractor will be held responsible for all costs required for correction of the unsatisfactory work, including payments for services, automotive expenses, equipment rental, supervision, and any other costs in connection therewith, where such unsatisfactory work as deemed by the Contracting Officer to be the result of carelessness, incompetent performance or negligence by the Contractor's employees. The Contractor will not be held liable for any work or type of work not covered by this purchase order.

8.3. Prior to settlement upon termination of the purchase order, and as a condition precedent thereto, the Contractor shall execute and deliver to the Contracting Officer a release of all claims against the Government arising under or by virtue of the purchase order, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release in stated amounts to be set forth therein.



APPENDIX B

LOCATIONS OF ARCHAEOLOGICAL SITES

APPENDIX B: Archaeological Site Locations

List of Maps* (USGS Quadrangles, 7.5 minute series):

- B-1. Charleston, Mo.-Ill.
- B-2. Wyatt, Mo.-Ill.-Ky.
- B-3. Wickliffe, Ky.-Mo.
- B-4. Anniston, Mo.
- B-5. Wickliffe SW, Mo.-Ky.

Key:

Orange Line = Limits of Study Area

Green Lines = Area excluded from proposed survey

Black triangle/Irregular hatched area = Prehistoric
or Unidentified site

Red circle = Historic Site

* Maps are in separate envelope.

Archaeological Site Inventory

Twp.	Rng.	Sec. @	ASM# (23MI-)	Name	Cult.*	Type**	Soils\$	Elev. #
25N	17E	2(o)	578	BRP 46	P	c/v	46	310'
25N	17E	2(o)	579	BRP 47	H	f	42	310'
25N	17E	2(o)	580	BRP 48	H	f	42	310'
25N	17E	6(o)	36		U		54	305'
26N	16E	25(o)	589	BRP 19	P(W) H	v/h hs	33, 37A	310'
26N	16E	36(o)	24		P	v	47	310'
26N	17E	2	595	Dugan	P(W)	v/h	63	315'
26N	17E	2&3	38		P		37A	310'
26N	17E	3	590	BRP 24	P(W)	v/h	37A	310'
26N	17E	10(o)	591	BRP 22	P(W) (M)	v/h	46	315'
26N	17E	14	145		P	ls	54	305'
26N	17E	19(o)	592		H	f	58	315'
26N	17E	19(o)	601		H	hs	67	310'
26N	17E	20(o)	602		H	hs	58	310'
26N	17E	27	20	Burkett	P(A) (W)	c c/v	47	310'
26N	17E	28	25	Weems	P(A) (W)	c c/v	33, 58	310'
26N	17E	30		UR-7	P		33, 63	310'
26N	16E 17E	25(o) 30&31(o)		UR-8	P		54, 37A, 46	310'
26N	17E	31(o)		UR-11	U		37A, 59	310'
26N	17E	32	543		P(A) (W) (M)	c c/v c/v	33	310'

Archaeological Site Inventory

Twp.	Rng.	Sec.	ASM# (23MI-)	Name	Cult.*	Type**	Soils\$	Elev.#
26N	17E	35	22	Goodin	U		46	315'
26N	17E	35	528		U		46	315'
26N	18E	4	139	HS#4	H	hs	42	310'
26N	18E	8	140	HS#5	H	hs	65, 42	315'
26N	18E	31(o)	534		U		42	305'
26N	18E	35(o)	531		U		65, 37A, 58	315'
26N	18E	36	532		U		63	315'
27N	17E	36	593	BRP 58	P H	ls hs	63, 58	310'
27N	17E	36(o)	594	BRP 23	H	f	42	305'
27N	18E	29		UR-1	U		41A	310'
27N	18E	29(o)	136	HS#1	H	hs	41A	315'
27N	18E	29	137	HS#2	H	f	42	310'
27N	18E	31(o)	37		U		42	310'
27N	18E	31	533		U		58, 59,	310'
27N	18E	33	138	HS#3	H	f	42,	315'

Key:

- * U = unidentified, P = prehistoric, H = historic,
A = Archaic, W = Woodland (Baytown), M = Mississippian
- ** c = camp, h = hamlet, v = village, ls = lithic scatter,
hs = historic scatter, f = residence/farmstead
- @ o = outside of study area limits
- \$ Soil Conservation Service soil map units (SMU) (Festervand
1981:23-52)
- # highest elevation

Historic sites

Distribution of Archaeological Sites within
and adjacent to the Study Area.

Mississippi County Mound Sites

Twp.	Rng.	Sec.		Site	Cult.	Type	Soils
26N	17E	2&3	S1/2	14 mounds incl. 1 platform md.	P(M)	t	63 Tiptonville 54 Reelfoot
		10	NE	4 mounds	P(W/M)	t/v	63 Tiptonville
		32(o)	C	mound	P(W/M)	t/v	55 Roellen
		33(o)	NW	mound	P(W/M)	t/v	58 Sharkey 33 Alligator
26N	18E	6		7 mounds	P(W/M)	t	58/59 Sharkey
		31	SE	4 mounds	P(W/M)	t/v	41A Caruthers- ville
27N	17E	35		mound	P(W/M)	t/v	?
		36		mound	P(W/M)	t/v	?

APPENDIX C

BOUNDARIES OF THE SAMPLING UNIVERSE:

AREA OF HIGHEST PROBABILITY OF ARCHAEOLOGICAL SITE OCCURRENCE

APPENDIX C: The Sampling Universe (Maps C1-5)

Key:



(Yellow) = Area of highest probability of site occurrence



(Black) = Land graded areas



(Red) = Previously surveyed areas

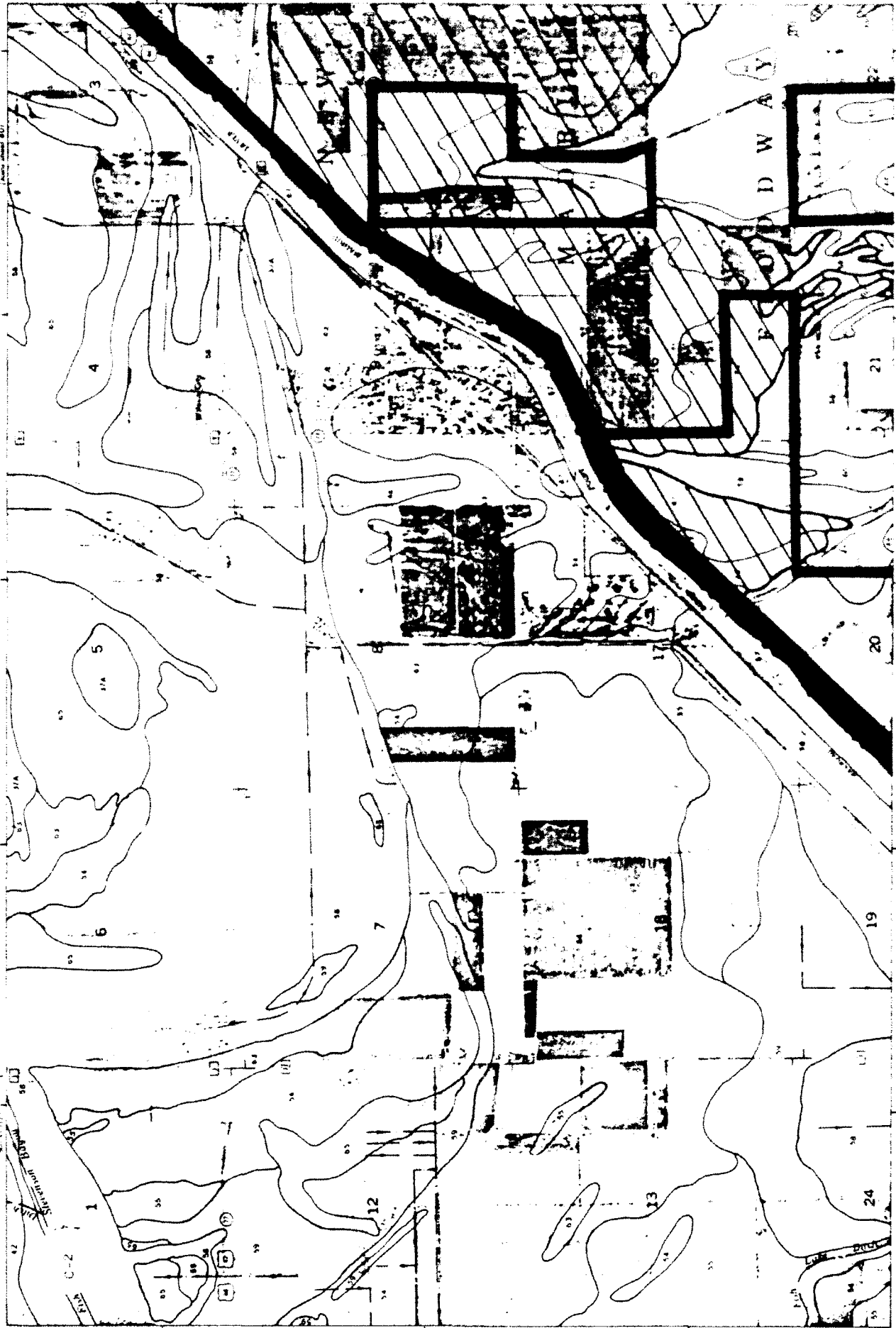


(Black) = Boundary of study area

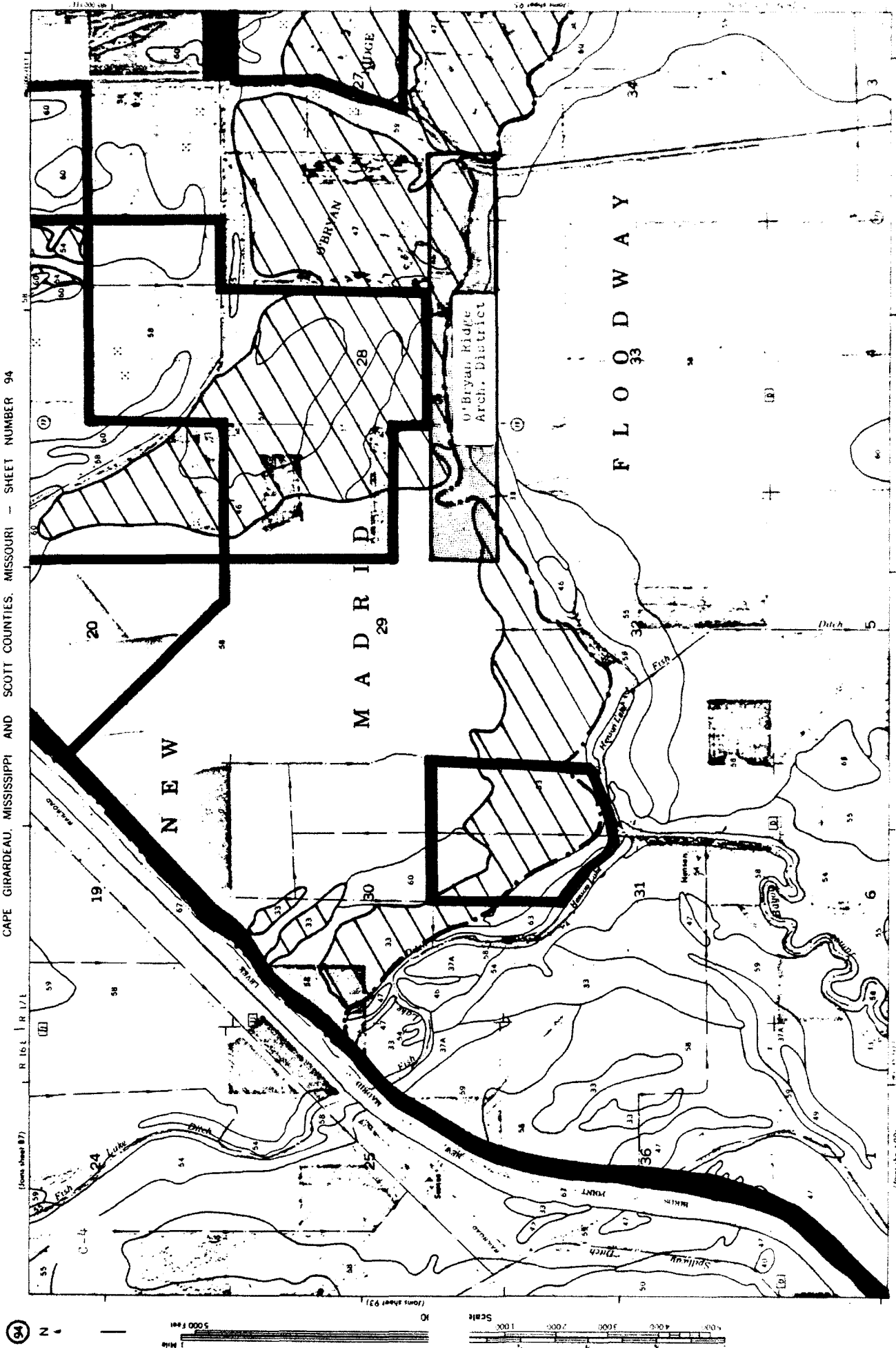


(Red) = Boundary of area excluded from proposed survey









CAPE GIRARDEAU, MISSISSIPPI AND SCOTT COUNTIES, MISSOURI - SHEET NUMBER 95

